JANUARY, 1953

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Detailed information on lead plating processes and their application.

An article describing factors in spray-silvering developed for use in electrotyping.

The methods and treatment facilities used to protect a city sewage system from harmful effects of wastes.

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by Palmer H. Langdon, 1868-1935

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The WASHINGTON OBSERVER

Charles A. Ceromi

News and Views from The Nation's Capitol

. Because of requirements for defense programs and for the national stockpile, none of the increased production of nickel can be made available to the electroplating industry, according to the NPA. Government policy requires that increases in nickel production are to be used for direct military production or are to be assigned to the stockpile. Questioning of NPA officials brought out that the plating industry is being allocated less than its proportionate share, based on 1950 usage, because other industries are devoting part of their allocations to the production of defense items. Also, platers in foreign countries are faring better than in the U.S. because they are using less nickel for military purposes, while we are putting more of our share of the free world's nickel supply into same. Just one of the advantages of being the arsenal of democracy!

. The addition of another 550,000 tons of steel to the allocations of the auto industry and other producers for the first quarter of 1953, as a result of increased production, may enable the industry to meet its full authorization of 1,250,000 passenger cars. With the coming stretch-out of defense goals, which will result in the closing down of several large arms plants, the auto makers may try to shoot for 1,500,000 cars, with the increased labor force which will then be available and the possibility of even further increases in steel allotments before the quarter is over. Put the above two reports together and they add up to less nickel on more bumpers. How much thinner can you slice the cake?

. For those platers who have been certifying, on their nickel purchase orders, that the material is to be used for nickel striking prior to chromium plating: effective with February orders, this certification is not necessary.

. On December 9th, the Small Defense Plants Administration reported that more than 500 proposed purchases by various branches of the Armed Services have been earmarked for small businesses exclusively. Two days later it set the small business share of the "special components" industrial expansion goal at 25% of the total of authorized new capital investment. Since it is not customary in Washington to let one hand know what the other hand is doing, there appears to be some doubt as to how much advantage the small plant will be able to take of this situation. The R.F.C., as a result of failure to speed up loans by giving power to its regional offices, has the small manufacturer backed against a stone wall. William A. Freeman pointed out in the New York Times last month that the total time, from the application procedure, through the appraisals and credit analysis to the title search and the drawing up of an agreement, may take seven months or more.

. Republican leaders in Congress have agreed not to act on any proposal to end controls until hearings have been held. Since it will be the middle of February before the new Congress is organized and has had a chance to hold hearings, controls are not slated to end before February 15th, if then.

. Production of primary and secondary metallic cadmium in September was 8% below the August output and the lowest since September 1951, according to the Bureau of Mines. Total output for the month was 661,314 pounds compared with 720,310 pounds in August. Metal producers' stocks of cadmium, however, surpassed the previous high set in August.

. A recodification of CMP Regulation 1 has been issued to aid industry. The NPA has announced that no major revisions had been made in the regulation but several minor changes indicated that the reprinting, into a single document, of all amendments and directions, should provide industry with a convenient, readily available reference source.

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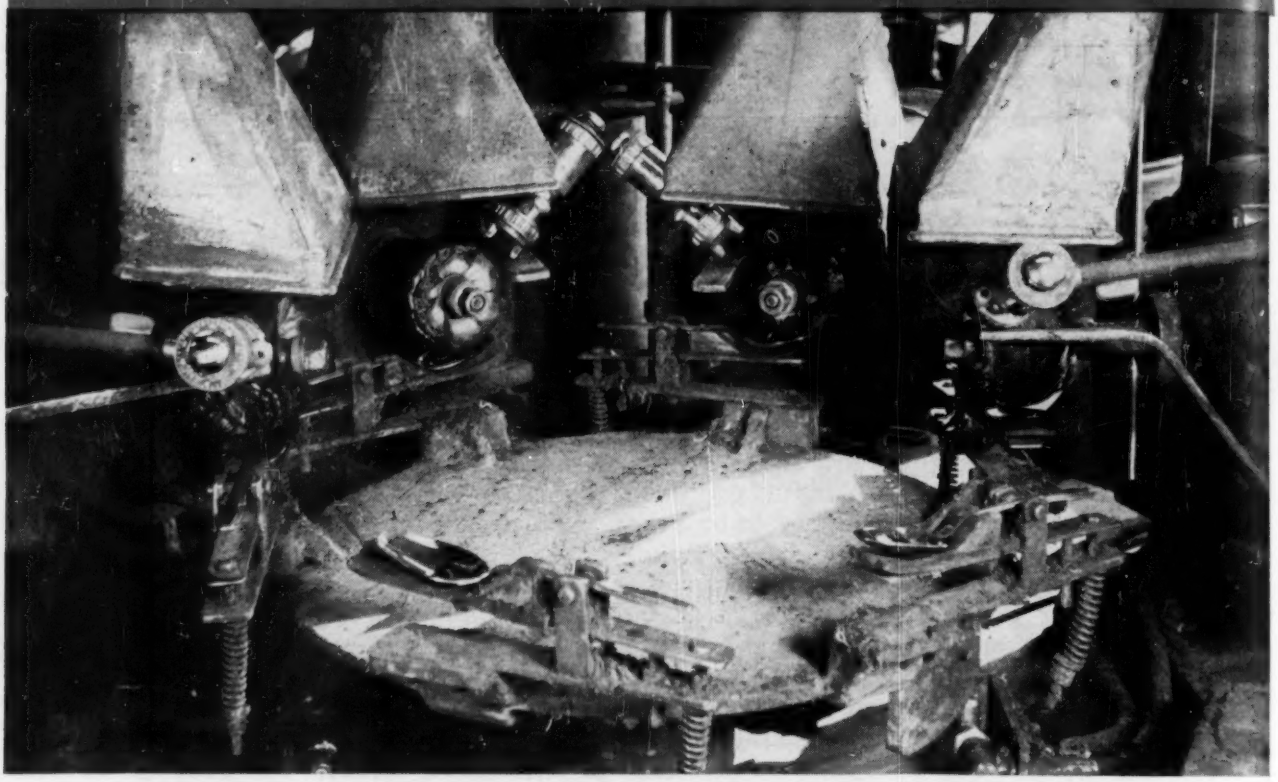

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1903-1953

Since 1903 we have seen the evolution of electroplating and its related industries from an infant barely knowing one solution from another to the highly technical Goliath of today. METAL FINISHING was founded as *Metal Industry* in January 1903 as a journal devoted to the non ferrous metals and plating. At that time there was a sharp distinction between the iron and steel industry and the light metals. With the passing of time a number of publications were merged and *Metal Industry* became more and more concentrated in the finishing industry — coatings on all metals ferrous and non ferrous. In 1939 we purchased the rights, title and mailing list of *Metal Cleaning and Finishing* which enabled us to change our name in 1940.

To properly commemorate this golden anniversary we have assembled the collection of articles on the following pages, each of which spans these years in a different way. George B. Hogaboom, the father of plating industry whose lifetime work coincides with our fifty years, writes on "The Plater of 1903"; Dr. Frederick A. Lowenheim, who has done more historical research in the finishing field than any other author, contributes "Fifty Years of Electroplating"; Dr. William Blum, the first man to bring standards of control to this industry, writes "Fifty Years Progress in the Testing and Specification of Electroplated Coatings"; Royal Clark, a well-known old timer, contributes a page on the early formation meetings of the American Electroplaters' Society.

And finally our own history, the story of journalism in the finishing industries by Thomas A. Trumbour, associated with this publishing organization since the *Aluminum World* days going back even before 1903.

On this occasion we wish to extend our grateful thanks to all those who have made this anniversary issue possible and especially to suppliers to this industry who have supported us in the advertising pages throughout the years.

L. H. Langdon

Publisher

George B. Hogaboom

The Plater in 1903

By George B. Hogaboom, *Consultant, New Britain, Conn.*

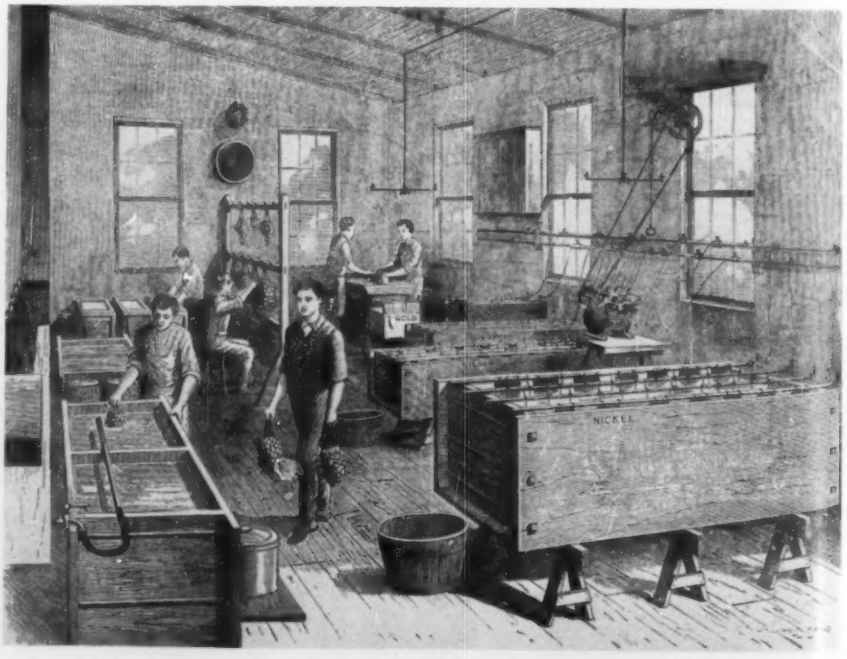
TEMPUS FUGIT. It seems only yesterday that a copy of *The Metal Industry* was received and my first position as a "foreman" plater was accepted. An indication of the general electroplating situation at that time can be had by the way in which the position — actually superintendent of the largest job plating shop in Newark, N. J. — was offered me. *James N. Morehouse*, owner of the job shop, was instructor in electroplating at the Newark Technical School, now the Newark College of Engineering. In September 1902 my enrollment as a student in the electroplating course was accepted. The course consisted of practical instruction on the finishing and plating of metal. The students brought their own work to be replated or pieces with which trouble was experienced where they worked. The equipment consisted of a knee-high polishing jack, a buffing lathe, a 40 gallon copper cyanide solution, a 40 gallon acid copper and a 40 gallon double nickel salt solution.

The textbook from which all the formulas were obtained was Langbein's "Electrodeposition of metals," 3rd edition (1898). All the solutions had been made by students of the previous year, so the only knowledge of their composition was gained from the above book.

This year some students brought some knives, forks and spoons to be silver plated. There was no silver solution so one had to be prepared. Several attempts were made by the instructor to make silver chloride without success. As my former position had been with a large silver plating concern in Connecticut, it was requested that the stripping of the plated pieces, their preparation, the compounding of the solution, the plating and final buffing be under my supervision. The pieces were successfully processed and, the evening the job was finished, the request was made for me to stay after the class was dismissed and have a talk with the instructor at which time the offer was made for me to take charge of the instructor's job plating plant. This was accepted and my foremanship began at $16.50 per week of 59 hours—and so often more. The wages may be compared with that of union polishers and buffers at $12.00 per week.

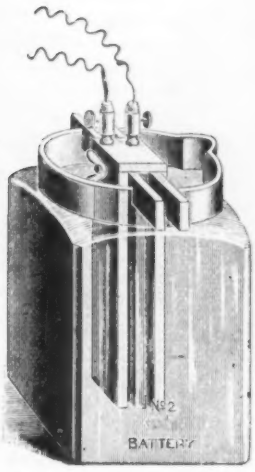
The equipment of the plant was as modern as the times. It was often used as an experimental and demonstration plant for large manufacturers of electroplating supplies and equipment. During my time there, one of the pioneers in the manufacture of buffing compositions tried out their new products.

One of the best customers was the *Weston Electrical Instrument Co.* which sent the round and "B" fronts of their instruments to be polished and nickel or acid copper plated. Stove parts, bicycles, skates, horse bits, hair clippers, pliers, tickets punches, cast iron lamp bodies and such general work constituted what was polished, plated with nickel or brass or cyanide copper or acid copper (duplex copper, i.e.: cyanide copper followed by a final coating of acid copper).

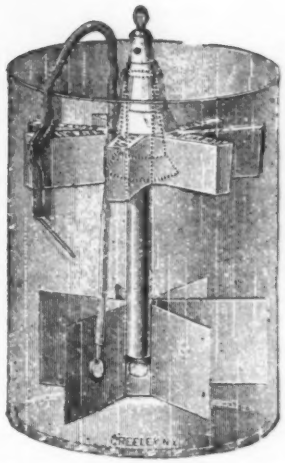


Plating room at the beginning of this century. Note the Weston generator.

Improved Bunsen Cell



H & VW Co. Bunsen Cell



Footes Pinnacle Gravity Battery

Leclanche

Generators started to replace batteries 1895-1905. Many used in small shops up to 1910.

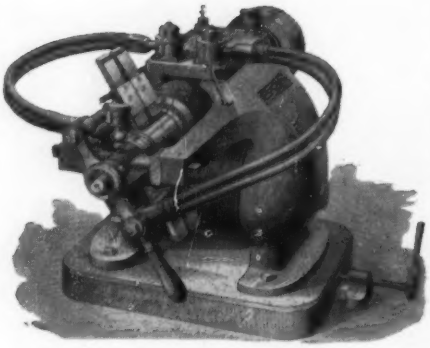
So as to present a "picture" of the processes and equipment, the several operations and materials used will be discussed separately.

The labor situation was about what is found today with a few exceptions. The shop was unionized and was under the direction of a shop steward. The "walking delegate," who was secretary of the local union, visited the plant at irregular intervals at which time the "boys" would be "called out" and assembled in the beer saloon across the street to enjoy "refreshments" paid for by the union. This happened regardless of how urgently a customer needed his work or how long the work had to stay in the plating solution. Today in many plants there is time in the morning for "coffee." During those days the boy was sent out for a can of beer. He had one or two long poles with hooks so that a number of cans could be carried at the same time. At our plant the boy had two poles each holding ten cans, labeled by their owners. It took several trips to supply the beer, during which time all work was suspended. A good "boss" would defray expenses at least once each week.

The newly developed compound wound generator.

Equipment

Only a few years prior to 1903 batteries were being used. In many small plants batteries were still the source of current for plating in 1903. A few plants had generators, or dynamos as they were generally called. The compound wound generators had been developed only a few years previously, not more than 5 years. Previous to that the shunt wound generator was the only one available. The trouble which the plater experienced in using the old type generators was reversal of the current. "Customers complained that the machines frequently reversed themselves and *unplated* partially plated work; that is, they actually sent current through the electroplating baths in the wrong direction after making a correct start. In service on a plating circuit it would deliver electrolyzing current in the right direction so long as the machine was kept running. The electrodes of dissimilar metals, being immersed in the electrolyte, produced a voltage of their own in opposition to that of the dynamo circuit. One mistake would spoil everything; there were neither instruments nor relays to protect the circuits and warn the operator of the dangerous condition. A method to correct this situation Weston invented was a device that was a centrifugal switch, consisting of a cup of mercury revolved by a belt from the dynamo shaft. Contact with a center electrode was broken only when the pool of mercury swirled fast enough to climb the walls of the cup."[1]



Shunt wound generator.

Fortunately this job shop had a more modern compound wound generator. They were just beginning to be installed but many plating plants were equipped with the generator that reversed.

The voltmeter and ammeter had just about been perfected. Few plating rooms had them. The voltmeter was the first to be generally used and platers, when they did discuss their work with the others, which was seldom, talked only of "volts" and operated the plating solutions at so many volts. The rheostats were of the "banjo" type with a galvanometer which only indicated that the current was on and in which direction it was flowing. The circular type rheostat had only recently been offered the plater. There was no panel board for control of the current from the generator nor for the control of current for the plating solution. The resistance wires of the tank rheostat would often get red hot, which was an indication that too much current was being employed. A low current had to be employed and, to obtain a "good" deposit of nickel, for example, the work had to be plated for a period of one to two hours. In one job, a tandem bicycle for performances on a stage had to be plated for three hours. Many cast iron ornaments for "parlor" stoves required an unlimited time of plating — long enough so that there would be a complete coverage of the background with a clear white coating and sufficient nickel on the plain parts to withstand coloring with a hard felt wheel using the new product of "lime." Ask your grandmother about her "parlor" stove with its beautiful nickel trimmings, of which she was justly proud.

The amount of current that can be used is given by Langbein:

"The following criteria may serve for judging whether the nickeling process progresses with a correct current strength: In two or at the most three minutes all portions of the objects must perceptibly be coated with nickel, but without a violent evolution of gas on the objects; small gas bubbles rising without violence and with a certain regularity are an indication of the operation progressing regularly. If, after two or three minutes, the objects show no deposit, the current is too weak, and in most cases the objects have acquired dark discolored tones. In such a case either a stronger current must be introduced by means of resistance board or, if the entire volume of current generated already passes into the bath, the object-surface has to be diminished. If, on the other hand, a violent evolution of gas appears on the objects, and the latter are well covered in a few seconds, and the at first white and lustrous nickeling changes in a few minutes to a dull gray, the current is too strong and must be weakened by the resistance board . . . or diminishing the anode-surface or finally suspending more objects in the bath. The density of current most suitable for nickeling copper, copper alloys, iron and steel is 0.6 amperes per 15.5 square inches, while zinc previously coppered requires 1.2 amperes. If very thick deposits of nickel are desired, . . . as soon as the deposit acquires a dull bluish lustre it has to be thoroughly scratch-brushed. Whether the deposit of nickel is sufficiently heavy for all ordinary demands is shown by rubbing a nickeled corner or edge of the object rapidly and with energetic pressure upon a piece of planed soft wood until it becomes hot. This test can be recommended as perfectly reliable."

The tanks were generally made of wood lined with a mixture of pitch and asphaltum. In warm weather the lining would soften and a large part of it would be near the bottom of the tank. This was, in a measure, overcome by heavily sanding the pitch and asphaltum. If any work fell to the bottom of the tank it became firmly imbedded in the lining. Often the wood would split in the sides of the tank and the salts of the bath would crystallize, causing unsightly looking tanks. If the crystallized salts were removed the solution would leak out and be a loss. Some steel tanks were used for the cleaning bath and for alkaline plating solutions. If the tank had a tendency to be cathodic, an enameled steel tank was recommended. As a rule the enamel proved unsatisfactory.

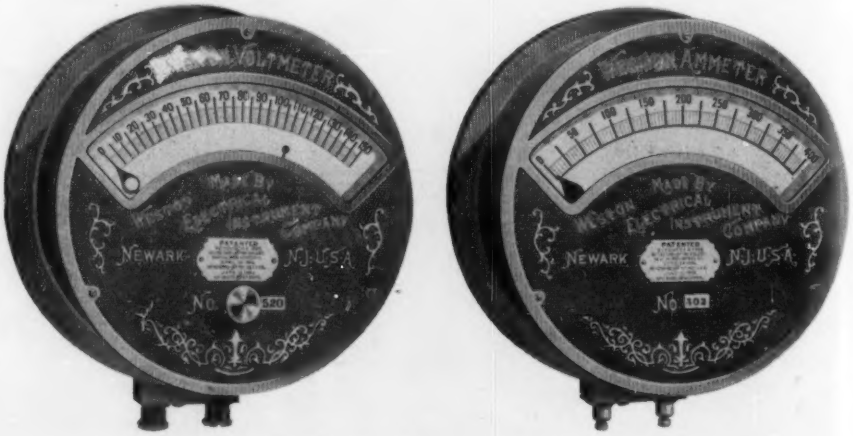
Preparing Work

The cycle for cleaning was the same as now in general use, clean, pickle, clean and then put into the plating solution. There were generally two alkali cleaning solutions — a soap soak and an immersion cleaner. At this time electric cleaning was not generally known. When it first came into use, soap would be carried over into the cleaner and the suds would entrap hydrogen gas resulting in an explosion which often emptied the cleaning tank.

The soap used was called "whale oil soap." It came in large barrels and was so solid that the staves could be removed and a chunk of soap carved out with a large knife similar to cutting a head of cheese. Chlorophyll had not been discovered and there was always present in a plating room a pungent odor.

For the alkali cleaner "rock potash" was the best to be had, although many used "Salicornia" lye. The "rock potash" also came in barrels and stood as a solid mass when the staves were removed. A hammer and chisel had to be used to "crack" off a piece. If too large a piece was put into a warm solution there would be a violent action and in many cases an "explosion." There were no multiplicity of cleaners and the plater had to use care so as not to be "burned" when making up or adding a cleaner.

Work that was polished had to be scrubbed in gasoline, due to the high wax content of the polishing compound. The compound would be imbedded in the recesses of cast iron



First Weston volt and ammeter 1898.

Advance type rheostat. 1900.

Time dial used instead of an ammeter.

parts, e.g. stove ornaments, and at times had to be soaked in the gasoline to loosen up the compound. Cast iron was always difficult to prepare for plating. Sometimes it was almost impossible to plate chilled cast iron or metal overheated during melting, which "burned" the sand into the face of the casting, probably resulting in a silicon-iron coating. The sand castings were as a rule jack-stone rolled to remove the sand. Sand blasting was not in general use. Grit blasting was unknown. They required pickling in hydrofluoric acid, especially if a frosted white nickel background was required. Rubber gloves could not be used for the subsequent scouring with pumice and water and the hands of the plater suffered accordingly. All steel parts were pickled either in sulfuric or hydrochloric acid, generally the former due to the expense and fumes of hydrochloric, which was, and still is, called "muriatic" acid, After pickling, the steel was scrubbed with sea sand or pumice and water. Small brass articles often could be put through a cyanide dip without scrubbing. Large brass parts and castings, after cleaning, were scoured with a weak solution of sodium cyanide and powdered Vienna lime. Cumbersome parts made of steel, like tubing for bicycles, etc., were generally scrubbed with cyanide and lime, which acted as a precautionary detergent method.

Solutions

A nickel solution contained 12 oz. nickel ammonium sulfate per gallon of water. This was *Dr. Isaac Adam's* formula, the patent for which was sustained by the United States Supreme Court. Edward Weston added boric acid, a weak acid, "*to produce a nickel plate that was as soft and smooth as silver, that could be rolled or hammered, and that did not flake off.*"[1] It was also found that the addition of sodium chloride to the solution increased the "conductivity."

The nickel solution used in the job shop was prepared with 9 oz. nickel ammonium sulfate, 3 oz. boric acid and 3 oz. of common salt per gallon. This mixture could be obtained already compounded and all that was necessary was to dissolve it in water. The control of the ingredients was almost strictly by "rule of thumb." There were no methods for determination of metal, chloride or boric acid content. The only "instruments" were litmus paper and a Baumé hydrometer. "*The solution should stand at 6½° to 7° Baumé.*"[2]

In a booklet by one of the large supply houses instructions are given on "Difficulties Encountered in Working Nickel Solutions and Their Remedies."[3]

1. The solution may become too alkaline, which may be caused by the electric current being too intense, or insufficient anode surface. The remedy for this is to neutralize the solution, which can be done in two ways; first, by adding sulphuric acid, drop by drop, until, after stirring the solution and testing with blue litmus paper, the paper turns to a dark purple color when dry. This method of neutralizing the solution is very good provided the solution is rich in metal. But if the solution is weak in metal, add single nickel salts to the solution until it is neutral, testing with blue litmus paper as above.

2. The solution may become too acid; in that case add ammonia drop by drop, stir and test with litmus paper until the solution becomes neutral. If then a brown slimy precipitate forms after a short time (which can be determined by putting a little of the stirred solution in a glass and letting it stand for about half an hour) the solution must be filtered, preferably through canton flannel."

"The 'pitting' occurs principally on steel or iron work. This happens principally in a nickel solution which is somewhat acid, and it is also apt to occur in a solution weak in metal. The only remedy for this is to add single nickel salts to the solution, at first about one pound to every ten gallons of solution. Should this not stop the "pitting" (after of course neutralizing the solution with ammonia, filtering the precipitate from the solution if one forms) then add more single nickel salts. This must be continued until the "pitting" stops, of course keeping the solution at the proper degree Baumé by adding water and keeping it neutral by means of ammonia."

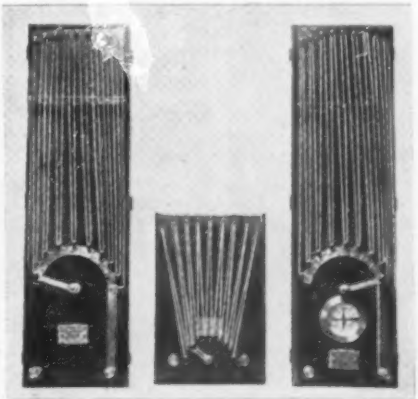
7. "The nickel may precipitate in the form of basic salt from too intense current and by the solution becoming too alkaline. Dissolve the basic salts in boiling water and put back into the tank; then if the solution is too alkaline add single nickel salts, first dissolving same."

In cold weather the nickel salts would crystallize on the anode and sides of the tank unless the plating room was kept warm. Often it was necessary to have a "pot" stove to maintain a temperature of approximately 70°F. The salts crystallized at 60°F.

"Having everything ready for work we must know before going any further 'What takes place in the Nickel Solution during electrolysis?" Nothing is of greater importance to the nickel plater than to know what is going on in his nickel solution.[3]

How many platers today and, yes, control chemists, would like to "know what is going on in his nickel solution"

The nickel anodes were the cast type, generally from sand molds. Due to the high melting point of nickel, iron and carbon were added so as to obtain a "good" anode. The anode used at this time was approximately 90-92% nickel with about equal amounts of iron and carbon. One manufacturer of anodes added a small amount of tin so that the metal would flow better when poured. The nickel would be "leached" out of the casting leaving a form about the same shape as the original anode. Many times the plater would wonder why the metal content of his nickel solution was decreasing. He soon found



Typical rheostats. Note the galvanometer.

out by trying to clean the coating of carbon and iron off the anode and finding only a sliver of nickel left. The subject of whether to clean or not to clean the nickel anode was a subject of discussion in *The Metal Industry* for several years and was well covered recently in the excellent series of papers, "All of our Yesterdays," by *Dr. Frederick Lowenheim.*

The sliver referred to above was the precipitated iron hydrate caused by the iron going into solution and the solution becoming alkaline. (pH was not known to the plater until 20 years later.)

Stripping of defective work was a problem which, together with the cause and correction of "pitting," are still among the "unsolved problems."

Cyanide Copper

The cyanide copper solution was made in several ways. To copper sulfate sufficient aqua ammonia was added to obtain a neutral solution indicated by a distinct blue color. Sodium or potassium cyanide was added until the solution was clear i.e. a clear wine color.

Copper acetate was used for solutions for all metals. A typical formula for warm baths was:

Water	1000 parts
Acetate of copper (crystallized)	20 parts
Carbonate of soda (crystals)	20 parts
Bisulphite of soda	20 parts
Cyanide of potassium	20 parts

For preparing this bath, the acetate of copper was put first into the vessel and moistened with sufficient water to make a homogenous paste and, after stirring, a light green precipitate was formed; 200 parts more of water were then added with the bisulphite of soda when the magma became a dirty yellow color.

Lastly, the remaining 600 parts of water and the cyanide of potassium were introduced. When this was completely dissolved, the result was a colorless liquid, which was the coppering bath. "*If we desire a perfectly limpid bath, we pass it through filtering paper, or decant after settling.*"[4]

About this time carbonate of copper began to be used. Due to complete removal of the sulfate from the basic copper carbonate, considerable difficulty was experienced with streaking of the deposit. As the dry copper carbonate was hard to 'wet' many platers made their own copper carbonate.

A general formula consisted of:

Blue vitriol	10½ oz.
Crystallized carbonate of soda	10½ oz.
Water	10 qts.
Pulverized bisulphite of soda	7 oz.
Crystallized carbonate of soda	8½ oz.
98-99% potassium cyanide	8½ oz.

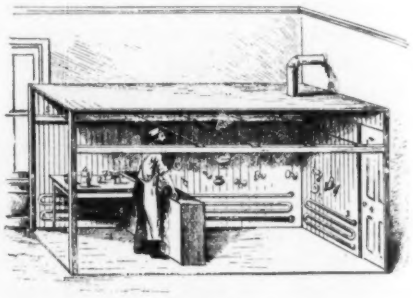
"First dissolve the 10½ oz. of blue vitriol and the 10½ oz. of crystallized carbonate of soda, each by itself, in hot water, and mix the two solutions; allow the precipitate of carbonate of copper to settle, and pour off the supernatant clear fluid. Then pour upon the precipitate 5 quarts of water, add the bisulphite, next the carbonate of soda, and mix this solution with the solution of the potassium cyanide in 5 quarts of water. The fluid rapidly becomes clear and colorless, when it is boiled and filtered."[5]

Acid Copper Solution

"The best method is to fill the vat two-thirds full of water-free from lime. If lime is present in the water it will reduce the conductivity of the solution by absorbing the acid, and the result will be a brittle deposit.

In order to saturate the water to the proper density, suspend in the upper portion of the vat (in cheesecloth bags) 1¾ pounds of copper crystals to each gallon of water. Do not throw the salts into the bottom of the vat as the layer of water in contact with them soon becomes saturated. When the crystals have dissolved for some time, stir the solution with a wooden paddle and test with an acid hydrometer. When the solution shows a density of 14° the bags containing the salts are removed and a gill of sulphuric acid is added to each gallon of water in order to raise the solution to 16°.

A deposit from a neutral solution is rough, irregular and brittle, but if tin is present the deposit is excellent and tough, even though it shows no trace of tin.

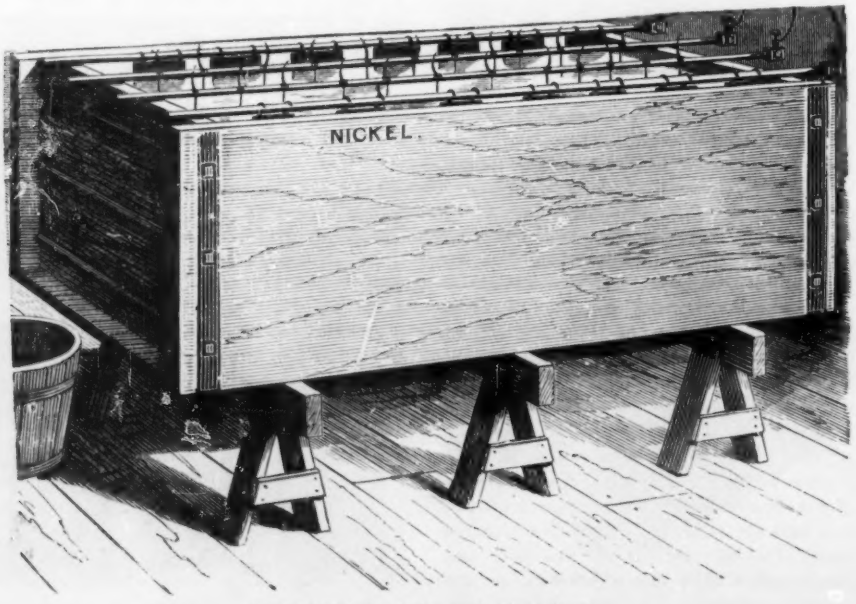


Lacquer room.

When the bath becomes surcharged with iron, zinc, etc., a portion of the solution should be removed from the bottom of the vat, from time to time, by a siphon and replaced by a like amount of water and a few gills of sulphuric acid. If the solution becomes too sour, which is owing to an excess of acid, streaks will appear and the deposit will be brittle. Siphon about 10% of the solution from the bottom of the vat and add the like amount of water. Another method is to add about one ounce of whiting to each gallon of the solution, to neutralize the excess of acid."[6]

Brass

In this period there was much secrecy of formulas and operation of plating baths. The only solution that was the subject for general discussion was the brass solution, the reason being that it was the most troublesome bath to obtain consistently good results. There were two reasons why the brass bath was difficult to operate, one of which was the low solubility of potassium zinc cyanide which was recom-



Typical nickel solution tank. Pitch lined.

mended in every formula published. In the job shop it was my good fortune to be able to do acceptable brass plating. The reason was not learned until several years later. Sodium cyanide had been offered the plating industry only a short time previously. Due to it being less expensive, it gradually replaced potassium cyanide.

The trouble with obtaining a uniform color was not over, however, and it was not until almost ten years later that it was learned that use of high zinc content solutions and anodes were the cause of "zinc pink" deposits which were often mistakenly attributed to high copper content of the solution which naturally called for greater zinc or aqua ammonia additions to the solution. Many platers advocated the use of copper anodes, which proved to be of value. Until it was recognized that the color, and good brass deposits always depended upon color, of a deposited alloy was not the same as that

1897 Barrel Plating Machine.

of a fabricated massive metal, an electrodeposit of brass having approximately 80% copper and 20% zinc was comparable in color to common high brass of 65% copper and 35% zinc. With the adoption of the 80-20 anode and solution, brass plating proved to be less difficult. It was also learned that other copper-zinc ratios could be used to obtain a desired color provided sodium cyanide and low zinc content solutions were employed.

Typical of the formulas used during this period:

"Dissolve 1½ ozs. each of cyanide of copper and cyanide of zinc, 1⅛ drachms of pure 100 per cent potassium cyanide, 1⅛ drachms of crystallized sal ammoniac and 5½ drachms of ammonia-soda in one quart of lukewarm water . . . From the composition of this bath it will be seen that it contains quite a large content of metal."[5]

"Brass plating is not at all like gold and silver plating. The method of manipulation is quite different and much more difficult, because two different metals that are united, copper and zinc have to be dealt with. We will demonstrate the difficulty that an operator has to overcome to arrive at a satisfactory result. For instance, take a quantity of sulphate of copper and dissolve it in water. When the crystals have been dissolved, add carbonate of soda until the copper settles at the bottom. Do not put too much carbonate in at once, for if that is done, there will be an undesirable effervescence.

When the copper has settled, throw the water away and wash the sediment, technically termed carbonate of copper, three or four times, until the acid and the carbonate have disappeared, leaving only the carbonate of copper. Every time the sediment is washed, let it settle. The same method is pursued with sulphate of zinc. When the carbonates of zinc and copper have been obtained, take two parts of copper and one part of zinc. It is, of course, understood that large quantities are spoken of and that it is more advantageous for the plater to prepare the carbonate of copper himself, as he will find it to be much cheaper. For every pound of copper, take a pint of ammonia, when an azure blue will be obtained, known in the trade as copper of ammonia. Then add cyanide of potassium until the copper and zinc are dissolved. A yellow color will then have been obtained. For every pound of copper and zinc, add from four to eight gallons of water; for every four gallons of water, add one pennyweight of arsenious acid. The latter is added for the purpose of giving a bright tone to the plating. Then add cyanide of potassium until from 8° to 10° Baumé hydrometer has been arrived at. It is a rule in electroplating that 20° Bé must never be passed. For every pound of carbonate of copper and carbonate of zinc, add four pounds of carbonate of soda.

Theory is very good in its way, but practice is by far the most important. This solution can be used for any metal and in large quantities, and will be found invaluable to the plater."[6]

Zinc

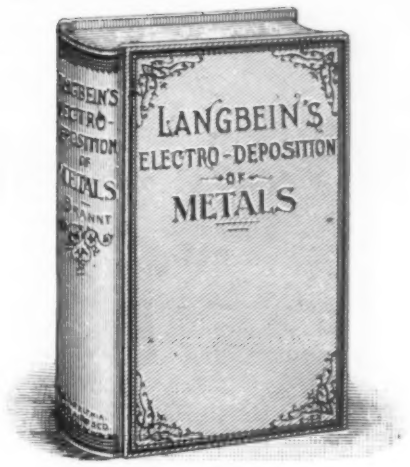
The deposition of zinc from an alkaline solution was not general practice. There is no workable formula published in the literature of this period. About 20 years later the cyanide solution became known. This solution, published in 1923, is the first reference this writer has located:

Water	1 gal.
Sodium cyanide	2½ ozs.
Zinc cyanide	3 "
Caustic soda	3 "
Granulated salammoniac	2 "

Solution should stand at 6½° Baumé.

Use a current pressure of 2 to 2½ volts.[2]

The acid zinc baths were generally made from proprietary compounds, the composition being zinc sulfate, sulfuric acid and alum or aluminum sulfate. This solution gave excellent results. The only difficulty experienced



"Text" book 1898

was due to the change in acidity of the solution. As there was no simple method to determine what is now known as "pH" of the solution, it was not possible to control the acidity of the bath. If the pH dropped below 4.5 through operation or carry over of alkali from cleaning solution the alum would coagulate and a heavy mass would precipitate in the solution. The remedy, as was customary with many solutions during this period, was to "pull the plug" and make a new solution.

One interesting comment:

"To Deposit Zinc. Make up a solution by dissolving 2 ounces of zinc oxide in a gallon of water in which previously have been dissolved 20 ounces of alum. It is used warm or hot. The anode is zinc, and the whole matter is exceedingly simple. All metals take the coating."[7]

Silver

This composition of this solution has stood the test of time. From the time of George Richards and Henry Elkington (Pat. No. 8447, Mar. 25, 1840) until today, it has included a salt of silver, oxide, cyanide or chloride, dissolved in a solution of potassium cyanide. The silver cyanide salt is the only one used today. A strike solution was also employed previous to the plating solution.

The control of the plating solution:

"By observing attentively the behavior of the anodes under galvanic action, the operator will acquire valuable indications respecting the composition of the bath, the proper proportion of its component parts, and the results which he may expect from it.

Thus, should the anodes blacken during the passage of the electric current, it is a sure proof that the solution contains too lit-

(*Concluded on page 85*)

Fifty Years of Electroplating

By Frederick A. Lowenheim

JANUARY, 1903: a new trade journal makes its bow to the metal trades, and promises that it will devote attention in its columns to, among other things, electro-plating (which had not yet lost its hyphen). *Metal Industry* (now the magazine you are reading) was not the first such journal, but it is the only one now extant in America which has a continuous history of serving the electroplater over such a long period as fifty years. In its earlier days, though, *Metal Industry* had many other fish to fry besides plating: brass founding, galvanizing, metal working and many other allied arts came within its ken, and it is only comparatively recently that it has finally relinquished these other fields and concentrated on the finishing of metals; and still more recently that it has been found advisable to split off organic finishing as still another specialty in this age of specialization. This development parallels the emergence of the electroplater as a specialist in his own right, and of electroplating as a discipline worthy of its own literature.

The present author cannot claim to remember conditions in the plating industry in 1903, since he then was not even a vital statistic. Nevertheless the trade journals, particularly this one, hold a mirror up to nature and permit the formation of a very good picture of the state of the art: one which several "oldtimers" have been kind enough to remark* is not too inaccurate.

It is customary, on such occasions as fiftieth anniversaries, to indulge in a backward glance and remind ourselves of conditions as they existed at the beginning of the period under consideration. A somewhat too common practice is to laugh indulgently at the follies and mistakes of our predecessors — their funny clothes, walrus mustaches and unscientific ways — in order to contrast them with the streamlined, neon-lighted, air-conditioned and atomic-powered present. Such is not the intention of this writer; as I have remarked before, not originally, we of the present day can see farther than our predecessors because we are standing on their shoulders. As a genuine and great "Old-Timer" writing in other pages of this issue is probably telling you, he knew a great many tricks fifty years ago that the modern plater might do well to study.

Dr. Frederick A. Lowenheim

Conditions Have Improved

Of course, the phrase "conditions in the plating trade" whether fifty years ago or today is somewhat ambiguous. If a layman asked to be shown a typical plating shop of 1953 would you take him through a back alley, climb over empty crates and rusty drums, and proudly exhibit an array of leaky tanks, crud-encrusted bus bars and a floor resembling a Louisiana bayou (which nevertheless, be it said, often by some miracle manages to turn out pretty good work); or would you usher him into a neat office where you would be met by a conventionally-dressed supervisor who would guide you through a well laid out, efficient and quite reasonably clean plating plant? You can find both types of shop today, as you could fifty years ago.

When that has been admitted, however, it must also be said that conditions have improved: the plating shop of today is more likely to be neat and well-run than that of the turn of the century. This is a reflection not so much of a modern approach to godliness through its proverbial neighbor, as to the recognition of electroplating as a distinct technology. One of the principal complaints of the plater in 1903, often voiced in letters to the editor, was the lack of status of the electroplating departments of manufacturing establishments, which were frequently treated as mere appendages with no voice in company planning. By and large, then, it might be fair to say that one of the principal changes which has taken place within the period of our review is an elevation of the status of electroplating and electroplaters.

With the usual honorable exceptions, electroplating at the turn of the century was both a very limited and a not entirely respectable technique. As to the first, a dictionary of the period defines it as the art of covering base metals with a coat of silver — although it must be admitted that the lexicographer was even then rather behind the times, since certainly copper, zinc, nickel and gold plating were common enough. As to its respectability, plated ware was thought of by the general public as an inferior substitute for the real article, so that electroplating possessed, to a degree, the status of legal counterfeiting.

Specifications were practically unheard of in 1903 and, in fact, hardly entered the picture in any important respect until our involvement in the first World War. The notion that electroplated coatings could be produced uniformly in such a way that their performance could be depended upon was one which developed slowly over the years, and which required a second World War to establish firmly. (Should it be remarked, sotto-voce, that it is also one which post-war shortages are rather quickly uprooting? To judge by the quality of some recent production

In letters to the author commenting on the series "All Our Yesterdays."

we're right back in 1903.) Electroplating has thus, in fifty years, progressed from the status of a mere adjunct to that of an integral and functional part of the manufacturing process.

This then is the principal fact, the great change. Plating in 1903 was an art, deliberately kept shrouded in mystery by many of its practitioners, who were jealous of its secrets and carefully guarded the recipes and the cabala. Many believed that the trade should close ranks and create artificial shortages of skilled artisans — for the usual mercenary reasons. Fittingly enough, its results were more often artistic than utilitarian: great emphasis was placed upon the coloring of metals and upon the various unusual and often ornate effects which could be obtained: French gray, verde antique, artificial patinas and the rest. It required the skill and experience of the plater combined with delicate buffing and polishing to turn out the best of the finishers' art, and there is no intention here to deprecate the results; but it cannot be denied that today's emphasis has shifted away from the arts and crafts approach and toward that of treating electroplating as a step in the assembly line, capable of being scientifically organized and systematized.

Supplies Are No Longer Homemade

This major development of the past fifty years has been caused by, and has itself caused, many other developments, all of which have helped to alter the aspect and the atmosphere of the electroplating industry. One must be struck first by the change in the situation respecting the supplies necessary to carry out the operations of plating: the chemicals, the buffing and polishing compounds, the anodes, the electrical and mechanical adjuncts of the plating shop. The modern reader, browsing through the pages of the first yearly volume of this journal, cannot fail to be impressed by the extent to which the electroplater of 1903 was expected to be his own manufacturing chemist. Did he wish to prepare a silver-plating solution? A helpful article on the subject told him to dissolve some silver in nitric acid, precipitate the chloride, filter, wash, dissolve in cyanide, and so on. A zinc-plating bath? Our man in 1903 had to buy the sulfate, precipitate the carbonate, filter and wash it, and all the rest. A minor revolution in plating shop practice was brought about by the introduction, late in the first decade, of commercial metal cyanides. Nor was the unavailability of many necessary salts the only trouble: even when the plater could buy the compound, rather than be forced to make it, he apparently couldn't be sure of what he was getting. Many correspondents in the trade journals complained of, and warned their fellows against, the poor quality and highly adulterated nature of such simple and essential commodities as sodium and potassium cyanides. Sometimes they were more than half common salt, with possibly another quarter being carbonate. The trade journals even printed articles on how to make your own cyanide — and one wonders how the plater ever got anything at all done. Needless to say, he compounded his own cleaners and buffing and polishing materials.

This lack of availability of standardized, reliable supplies probably was responsible, at least partially, for other characteristics of the plating trade fifty years ago which differentiated it sharply from that of today — and incidentally, of course, reflects the embryonic state of the chemical industry which in these fifty years has had such a phenomenal growth. Since the plater was forced to be, to a great extent, his own supplier, the leveling influence of the great supply houses, with their expertly formulated compounds and methods and their technically trained service representatives, was not nearly so much in evidence as today. This change in emphasis in the supply industry is by no means confined to the plating trade: in every branch of technology the modern supplier feels, or is forced to feel, a responsibility for the proper use of his product, and so have grown up the large technical service departments of nearly every chemical manufacturer. These technical service functions enforce a certain amount of standardization in the use of the products involved: all the customers of any particular manufacturer have access to his expert advice on optimum methods. Fifty years ago the plater did not have the benefit of this type of service; if he got into trouble he, more often than not, had to get out of it as best he could, making use of the advice (good or bad) of his friends, of the editors of the trade journals (all of which ran question and answer columns) or of his own native ingenuity.

The Plater Is No Longer On His Own

And ingenuity it was, for the plater of 1903 was very unlikely to have any knowledge of chemistry, of even a most elementary kind. For proof of this statement, it is only necessary to refer to some of the articles which appeared in the trade journals in the early years purporting to explain the facts of electrochemistry to the plater. (Some excerpts have enlivened the series "All Our Yesterdays.") Such pedagogical efforts fall for the most part into two groups: fairly sensible and accurate but so elementary in their approach that a high school freshman would find them beneath his notice; or so wild and woolly in their scientific foundations that their net effect upon the unsuspecting plater must have been one of hopeless confusion. And to judge by what the editors of the journals thought it necessary to explain, the plater of 1903, by and large, was no better informed as to the elements of electricity. Learned-sounding treatises expounded the simplest facts about the proper uses of ammeters, voltmeters and rheostats — and in fact it was only the more progressive practitioners who possessed these tools. Long and involved polemics enlivened many issues of this magazine, discussing the relative merits of the ammeter vs. the voltmeter as a control instrument, nor did it occur to the writers that the average establishment might be able to afford both. Many authors, in fact, were rather confused about which was which, to judge by the number of times they wrote such phrases as "A current of 4 volts."

In many of these matters we have progressed, these fifty years. But in at least one respect the present author, for one, believes that things have taken a turn for the worse: we have forgotten the art of the polemic, or we have abandoned the field to the politicians. What do you do when you see a technical article which you believe to be trivial, untrue, or unwise? Just so: nothing. You swear to yourself, make a mental note that the author probably flunked kindergarten, and go about your affairs. Not so your predecessor in the opening years of the century: if the bound volumes of this magazine are any guide, every reader was a self-appointed assistant editor and it was a dull issue indeed which did not contain a few "Communications to the Editor" to the general effect that if Joe Blank fancied himself a plater he had better stop writing such ridiculous nonsense as his article in the last issue, and so on. Of course, the accused Blank took occasion to reply to these slurs, usually not merely defending himself

but casting doubt on the parentage, education, morals and sanity of his detractor. That sort of thing sometimes went on for many issues; and speaking from the vantage point of 1953, it must have been fun. We are far too polite these days.*

There were polemics about nickel anodes — pure vs. impure, to scrape or not to scrape; as already noted, about ammeters and voltmeters; about copper plating, silver plating and brass plating; about general electrochemical theory, during which even Faraday's laws got a good going over; about the price of cyanides; and many, many more.

From the purely quantitative standpoint, too, the plating trade must have offered a far different aspect in 1903 from that of today: one need only enumerate the finishes available now which were unknown then, and to remember the standing in 1903 of the plater's two largest customers: the automobile industry and the electronics industry — the first barely starting, the second non-existent. Probably the word electroplating, today, calls forth the immediate association "chromium," at least to the layman; but chromium plating was not in the repertoire of the plater of 1903, nor would it be for another twenty-five years or so. Cadmium plating was practically unknown; tin could be plated, but was avoided where possible because there was no really good method and available baths were at best merely passable. Baths which gave a mirror bright finish were quite unheard of. Of course our 1903 plater didn't have some of our problems either: he was not, very often, called upon to plate on aluminum, zinc-base die castings, stainless steels, plastics or other outlandish materials. From an engineering standpoint, it may be noted that the development of automatic plating machines and other mechanical aids was in its early infancy, and rectifiers were in the distant future.

Shop Men Speak To Lab Men

We have noted before that in 1903 electroplating was a trade which, though it employed, perforce, scientific principles had every little understanding of those principles or of what factors entered into the final result. In 1953 we can say that, although many rule-of-thumb techniques remain, nevertheless the electroplater knows, on the whole, what he is doing and why he is doing it, and is actively searching for ways of improving his methods and their results. This indeed, to repeat, is the basic change which has taken place over the last fifty years, overshadowing the changes in detail or the individual improvements which could be recounted one by one. This change in status and outlook can be attributed to a great degree to the development which has been taking place in our society over the same period of time in all fields: the increased — one might say the overweening — prestige of science and the scientist, to the extent that one doesn't try to sell anything, from dog food to cigarettes, without a word of advice from the man in the white lab-coat. But this glorification of the scientist is a rather late development and electroplaters became aware of the possibilities of science somewhat earlier than the lay public did.

An examination of the files of this magazine will show that almost from the first issues various forward-looking practitioners of the plating art were pleading for more co-operation between the plater and the scientist. As we have noted, many authors tried to explain chemistry to their fellows, with varying results. From the first, too, some few scientists interested themselves in the practical side of electroplating. On the whole, though, the plater of 1903 was content to practice his art by guess and by God and, to the scientist, plating implied electroanalysis while cathode processes were confined to hydrogen evolution. In fact, electrochemistry as such was just emerging as a specialty worthy of its own organizations and publications; it is noteworthy that the first decade of the twentieth century witnessed the founding of the Electrochemical and the Faraday Societies and the establishment of this journal and another devoted to the electrochemical industries.

The electroplaters were not long in realizing that a trade organization would serve their interests, and from small beginnings in New York and Newark the American Electroplaters' Society gradually took shape. The era of real co-operation between the practical plater and the scientist can probably be dated from the Atlantic City meeting of the Electrochemical Society in 1913, to which members of the Platers' Society were specifically invited, and where a group of academic scientists presented review papers dealing with the electroplating of most of the common and important metals. These papers were freely discussed by the platers present, not always favorably, and the discussions as well as the papers are preserved for us in Volume 23 of the Transactions of the Electrochemical Society. They make interesting reading.

Of course in 1913 only the more progressive of the platers would attend a meeting of admittedly impractical, theoretically oriented scientists, and one could hear then — as occasionally even now — complaints that the practical man has no need of long-haired theoreticians and "beaker platers," as well as the obverse that the scientist has nothing to learn from the bag of tricks of the plater. But the spirit of co-operation has grown through the years: the AES welcomes the Ph.D. and the professor, the Electrochemical Society is glad to hear from the practical plater, and joint meetings of sections of the two Societies are common. Mutual contempt has given way to mutual respect.

At that 1913 meeting, the platers present pleaded for a little understanding of practical problems on the part of the professors, so that the work of the laboratories would be of more immediate benefit to the man in the shop. Over the years this understanding has come about, hastened of course by the exigencies of two World Wars which forced the co-operation, willy-nilly, of all available talent to get a job done.

The electrochemist in 1953 is faced with many problems. The mechanism whereby a metal is discharged at a cathode is still a mystery; and the whole theory of concentrated solutions remains uncharted. The practical plater too has his unsolved problems, some of them holdovers from Hogaboom's famous list: how to plate on the many new materials which other branches of technology are forcing on him; how to maintain or improve quality in the face of shortages of vital materials, and many more. But the central fact is that the scientist and the practical plater have, at this midpoint in the twentieth century, come to understand each other and to co-operate for the solution of both practical and theoretical problems. That fact makes it certain that when this magazine comes to celebrate its hundredth anniversary my successor will have truly astounding progress to report.

**I realize that these remarks are practically tantamount to an invitation to throw things at me. But then this isn't a technical article.*

Reminiscences of "An Old Timer"

The First and Subsequent Meetings Leading to the Formation of The National Electroplaters' Association of the United States and Canada

By Royal F. Clark, Sr., *Foreman Electroplater, Liberty Optical Mfg. Co., Inc., Newark, New Jersey*

"I shall pass through this world but once. Any good thing, therefore, that I can do, or any kindness that I can show to any human being, let me do it now. Let me neither defer nor neglect it, for I shall not pass this way again."
—AMIEL

THE above quotation is from the booklet of the Constitution and by-laws, May, 1910.

Of the eight platers who attended the first meeting, which was called by Charles H. Proctor in February, 1909, only two are alive today viz: George B. Hogaboom, Sr., and the writer, each having over fifty-two consecutive years experience in electroplating, and 104 years of plating represents a lot of plating. I can recall after forty-three years of membership in the N.E.P.A. of U.S. and Canada and the American Electroplaters' Society, the names of those platers who attended meetings in the "Old Astor House" and later at the Chelsea Hotel on 23rd Street, in New York City viz: Horace Smith, Justus Stremel, Percy S. Brown, Ben Gilchrist, Nathan Emery, William Schneider (Cyanide Bill), R. H. Sliter, Joseph Dimes, Palmer H. Langdon, L. J. Krom, Hugh Baxter, E. Blassett, Harry Flanigan, Fred Clement, George Gehling, John Painter, and Edward W. T. Faint.

At each meeting lively discussions were had relative to electroplating. To clean or not to clean nickel anodes was discussed pro and con. Can a nickel deposit be made whiter by the addition of boracic acid? Percy Brown advocated cleaning nickel anodes, and Ben Gilchrist did not believe in cleaning them, stating that nickel particles were brushed off with the carbon and went down the sewer. I myself, believe that Ben was right in his argument. Nickel anodes, as manufactured today of 99+ per cent nickel, are not cleaned.

The writer, while employed in Bridgeport during 1915 to 1919, had thirty-eight nickel plating tanks with seven hundred nickel anodes of the 92 per cent nickel type and, at inventory time, when anodes were cleaned and the sediment removed from the bottom of the tanks, quite some nickel went down the drain.

Royal F. Clark, Sr.

Harry Flanigan stated in his remarks on the whiteness of a nickel deposit, that he did not believe that a nickel deposit could be any whiter than the color of nickel as found in the earth.

Mr. Blassett, an expert on black nickel on typewriter parts, produced samples of black nickel that were really black and not of a greyish hue. When asked how he obtained such bright black deposits, he replied that he was obligated to his firm not to divulge his method. But several years later, the members could duplicate the deposit by immersing the parts in a solution of iron chloride and water.

Hugh Baxter was noted for keeping his cigar in his mouth when speaking on a subject. Justus Stremel, an expert on gold coloring, exhibited some beautiful specimens of his rose gold and antique green gold deposits. Harry Flanigan stated that "down East" gold platers were known as "Gold Colorers." He should know because he was one himself before he became associated with a lacquer manufacturer as a salesman.

Benjamin Popper was a "regular" in attendance and was always a "prince" among the members.

Edward W. T. Faint was a "regular" in attending the meetings and contributing papers on electroplating, and John Painter was an expert on electroforming of hollow ware in the acid copper solution.

Phil Sievering, Sr. was one of the "Old Timers" who was foreman plater at the Singer Sewing Machine plant in Elizabeth, New Jersey, and in 1888 opened a job plating shop in New York City, which became the largest job plating shop in the United States.

In 1910, the writer was shown through his plant, which was on three floors in New York. Phil had a large plating dynamo and was proud to remark that the commutator had never been turned down and that the original set of copper brushes were still in good condition, despite their twenty-five years of service.

Members from Bridgeport, Conn.; Waterbury, Conn.; Providence, R. I.; Philadelphia, Pa.; Reading, Pa. attended the meetings when we met once a month. In later years all the Newark, N. J. members formed the Newark Branch; Philadelphia members, the Philadelphia Branch in 1910.

The writer began his plating experience in September, 1900, after graduating from the Trenton High School, Trenton, New Jersey, in June, 1900. He and his wife will celebrate their own Golden Wedding Anniversary in May of this year. He can recall reading *The Metal Industry* back in 1900, and is still reading *Metal Finishing* magazine in 1953.

50 Years' Progress in the Testing and Specification of Electroplated Coatings

By Dr. William Blum

IN any field of applied science, three pertinent questions may properly be asked.

1. How are you doing it?
2. Why are you doing it that way?
3. How well are you doing it?

As applied to the electroplating industry, these three inquiries cover respectively (1) plating practice, (2) theories of electrodeposition, and (3) tests of plated products. Comparison of the status of these three phases before and after the interval of 50 years covered by *Metal Finishing* may well yield a measure of the progress that has been made.

A survey of the methods of plating now in use shows that relatively few entirely new types of plating bath are in commercial operation. Of these, chromium plating and cadmium plating are the best examples. Most of the sulfate and cyanide baths now used are quite similar to those described long before 1900. Some of the most recently advocated baths, e.g., the nickel fluoborate, were described early in the twentieth century by Dr. Kern at Columbia University, and lead fluoborate was used by Betts in lead refining. While some new types such as the sulfamates and pyrophosphates may displace the older baths, the latter are still in general use. It is no disparagement of the great advances made in plating cycles and equipment to say that, basically, plating baths have not been revolutionized in the past half century.

Actually, in the field of theory, progress has been relatively slow, owing to

Dr. William Blum

the fact that most of the researches and theories on the constitution and behavior of aqueous solutions refer to very dilute solutions, and are inapplicable to the concentrated baths normally used in electroplating. Advances in the knowledge of atomic, molecular, and crystal structure, and new technics such as the use of X-rays, electron diffraction, electron microscope, radioactive tracers, and single crystals, are putting new tools into the hands of investigators in this and related fields. The next few decades may be expected to yield much greater progress in our understanding of electrolysis than has been accomplished in the past 50 years.

Specifications Need Test Methods

In contrast, the methods of measuring and testing the properties of electrodeposits show great progress in the past half century. Before 1900, about the only gauge of quality of a plated coating was a statement of the time of plating, e.g., 2 hours in a nickel bath (at an indefinite and unknown current density). I trust that no lack of perspective is involved in the statement that the enormous expansion of the electroplating industry in the past 50 years has been more dependent upon the ability of the plating plants to insure with reasonable certainty the quality of the plated coatings than upon any other single factor. This ability in turn depends upon the availability of simple, reliable tests of quality. Without such methods, specifications for plated coatings are a delusion.

In the following effort to survey the progress in the testing and specification of plated coatings, no attempt will be made to discuss detailed procedures. Instead, the aim will be to point out the needs for tests and the extent to which those needs have been met. As will be clearly shown, much progress has been made, but there is still a great opportunity for the improvement of existing tests and the development of new, superior methods of predicting whether any given plated products will yield satisfactory service under the expected conditions of use.

In general, a plated coating (or any other material of construction) is selected because certain properties of that metal are favorable for the intended use, and in spite of certain unfavorable properties or limitations. Once a certain metal (or combination of metals) is selected for use in a given application of plating, it is necessary

to specify the properties of the desired coating, rather than of the metal itself. This is a valid distinction, even though the properties involved in the two decisions may be closely related. For example, the choice between a nickel and a silver coating for a given purpose may involve a comparison of these two metals with respect to color, tarnish resistance, hardness, electrical resistivity, and cost. After this decision is made it is usually necessary (or at least desirable) to specify for the metal selected the thickness, porosity, protective value, adhesion, and luster of the coating. The latter properties form the basis of most specifications, and hence must be susceptible to test.

Thickness Control

The most commonly specified property of a plated coating is its thickness because, in turn, this is related to the probable life of the coating. If the latter consists of a sacrificial metal such as zinc or cadmium, the life is about proportional to the thickness. If the coating consists of noble metals such as copper, nickel, or chromium, the porosity and protective value of the coating are directly (but not linearly) related to the thickness. In both cases, the thickness of a given metal coating determines its resistance to wear and abrasion.

One of the most marked changes in methods of testing coatings involves the distinction between the *average* and the *minimum* thickness. Up to and for some time after 1900, the few existing specifications for plated coatings defined the average thickness first because that was most easily controlled by the plater, and second because it was then difficult or impossible to measure the local or minimum thickness. The importance attached by early platers to the average thickness, usually expressed in the time of plating, is illustrated by remarks of an "old-timer" at a meeting of the Boston AES Branch over 25 years ago. In effect he said "In our day we had none of this quick cheap plating. We always put on heavy coatings, for example, we always gave two hours in the nickel bath." Then he added parenthetically "Of course we sometimes used to skimp in plating coffin trim, as we knew we would get no complaints from the user!" In the absence of ammeters, and with the use of the old double salt nickel bath, it is reasonably certain that the average current density was less than 5 amp./ft.^{2} and the average thickness was less than 0.0005" of nickel.

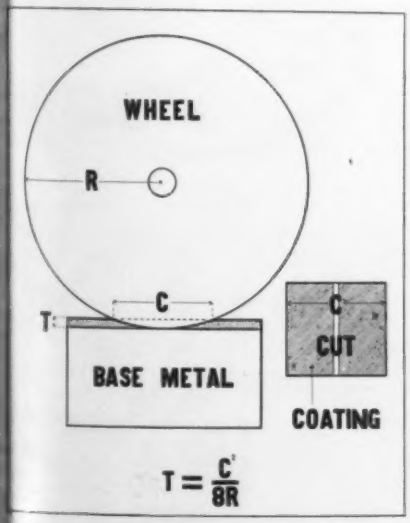


Figure 1. The application to flat surfaces of the Chord method devised by F. C. Mesle.

The demand for reliable methods of measuring the minimum thickness of plated coatings arose directly from the great expansion of the automobile industry during the second and third decades of this century. During the first years of the automobile, little attention was given to the quality of the nickel coatings, chiefly because the paint finishes then used were still worse in quality and protective value. With the advent of better body finishes such as "Duco," it was necessary to improve the quality of the plated coatings. This was accomplished through increases in the thickness of the nickel layer and, in the late 1920's, by the use of chromium plating, which owes its rapid industrial application largely to the auto industry.

When this industry attempted to specify the thickness of the plated coatings, it was soon found that a requirement of the average thickness was inadequate. Like the proverbial chain, the coating failed at its weakest link, i.e., its thinnest part. The only available method for measuring the local thickness and thus detecting the minimum thickness was the microscopic test. With proper experience and care, this is usually an accurate procedure, which is still used as an umpire test. But it is troublesome, consumes time of specialists, and is destructive. Hence, efforts were made to develop similar, preferably non-destructive, tests for the local thickness of plated coatings.

In 1935, F. C. Mesle devised the "Chord" test, which is effectively a mechanical means of magnifying the

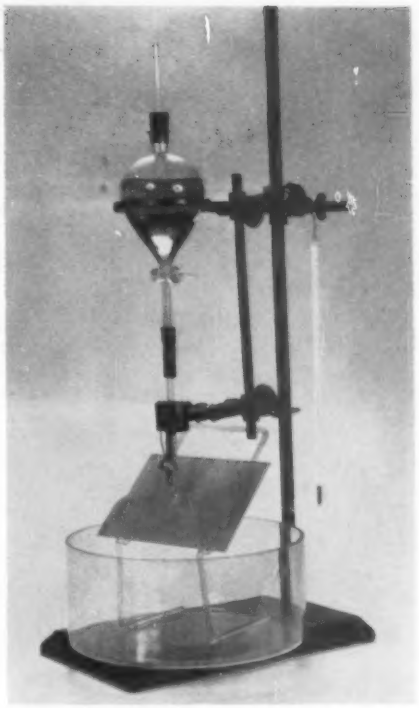


Figure 2. Apparatus used in the dropping test devised by S. G. Clarke.

thickness. The value and applicability of this test were demonstrated by W. Blum and A. Brenner in 1936.

During this same period, chemical tests for local thickness were developed, e.g., the "spot" test, described in 1922 by R. E. Maeder for copper coatings, and in 1929 by O. A. Stocker for thin chromium coatings. In 1933 S. G. Clarke, in England, described the "dropping" test, first used for zinc or cadmium coatings on steel, and later for tin and copper coatings. In 1936, he devised the "jet" test, used especially for nickel coatings. In 1940, S. Anderson and R. W. Manuel described an electrochemical test for thickness by measuring the time required for the coating to dissolve when it is made anodic with a specified current density.

Whereas the microscopic test requires cross-sectioning and hence destruction of the article tested, the various chemical methods destroy the coating on only a small area, so the tested article can be stripped and replated.

Still further improvement was made by the magnetic method, devised by A. Brenner in 1937, and applied in the "Magne-gage" and later in other devices. These procedures are preferable because they are non-destructive and, hence, can be applied economically to a larger proportion or, if warranted, to all of the articles in a given lot. The method is necessarily limited to those

Figure 3. The Magne-gage devised by A. Brenner.

articles in which either the basis metal or the coating is magnetic. Efforts are now being made to apply some form of electrical circuit to the measurement of non-magnetic coatings on non-magnetic basis metals, e.g., silver or gold on brass.

Other Factors Controlled

Adhesion

Good or "perfect" adhesion is essential for practically all plated coatings. While numerous efforts have been made to develop methods for measuring the adhesion of plated coatings, well summarized in a review made by A. L. Ferguson in 1946 and 1948 in AES Research Reports, no entirely satisfactory inspection method for measuring adhesion has yet been described. Most of the published methods, e.g., of E. A. Ollard in 1926, and of P. A. Jacquet in 1934, involve the plating of special specimens, and are useful in research but not for inspection. More recently (1950) A. Brenner devised the "nodule" test for adhesion, which may be applied to plated products, but has not yet found general application.

Porosity

It is well recognized that the protective value of noble coatings, e.g., of copper or nickel on steel, depends upon the permeability of the coating to the surrounding medium. This, in turn, is dependent upon the number and size of the pores or discontinuities in the coating, either those initially present or those caused by some form of selective corrosion. The many methods proposed for detecting initial pores, including the much-studied ferroxyl test, have not yielded methods of test that are sufficiently reproducible and significant to warrant inclusion in specifications. Recent studies by N. Thon on AES Project 6, and those in progress by F. Cogburn and associates on AES Project 13, show how complex is the subject of porosity and permeability.

In the absence of a specific test for porosity, much use has been made of the salt spray test, in spite of its admitted limitations and frequent false interpretations. The need for an inspection test that will at least simulate the results obtained in service, e.g., on automobiles in an industrial urban area, led to the organization of AES Project 15, in which exploratory studies are now being made.

One obstacle to the development of accelerated tests is the uncertainty that still exists regarding the exact behavior of plated coatings in service, and the factors that influence that behavior. The extensive exposure tests conducted since 1932 by the NBS, AES, and ASTM, have yielded valuable information that is largely the basis of the

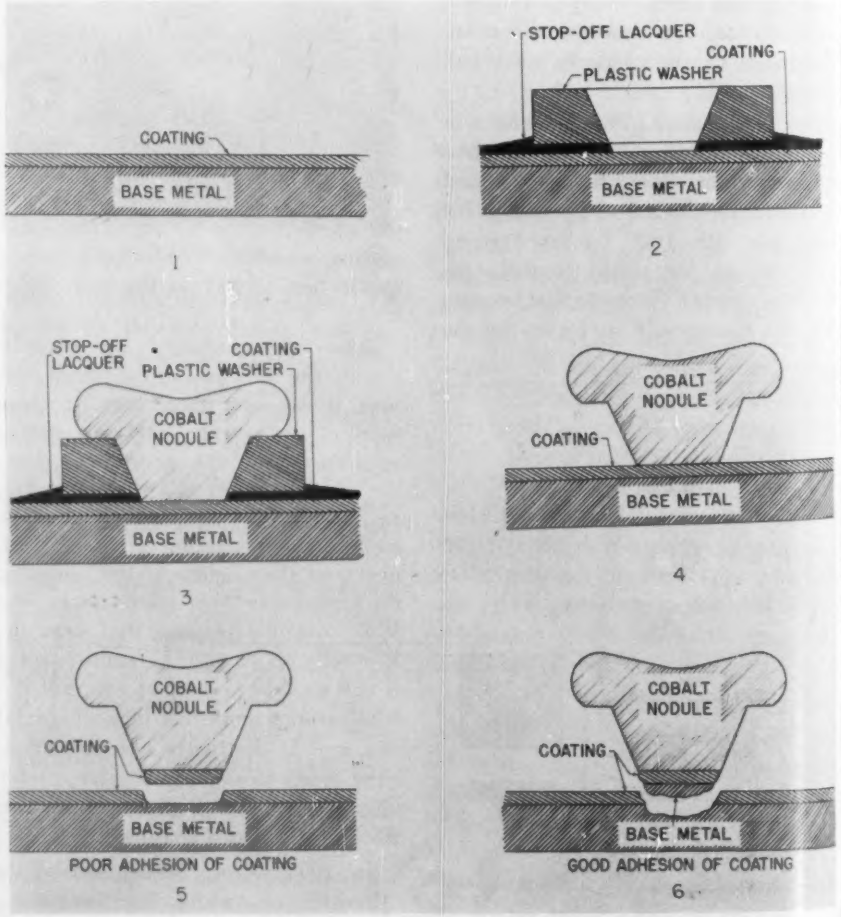


Figure 4. The principle of the nodule method for measuring adhesion devised by A. Brenner.

existing AES-ASTM Specifications. However, it is recognized that it is not possible to include in exposure tests all the factors such as washing, waxing and storage, that may influence the behavior of plated parts. More weight may therefore be given to the inspection of carefully prepared parts in actual service, as is now planned in Detroit as a part of AES Project 15.

Hardness and Wear Resistance

These properties are especially significant in those applications in which abrasion is important but, to some extent, they enter into the serviceability of all plated parts. The measurement of the hardness by indentation methods such as the Brinell, Vickers and Knoop tests, is satisfactory, provided the thickness of the coating is considerably greater than the depth of the indentation. The correlation of hardness with wear resistance is difficult and uncertain because many properties beside hardness may be involved.

Brightness

The prevalent use of chromium coatings to yield bright reflecting surfaces has led to a demand for methods of specifying and testing the brightness of plated surfaces. Methods for measuring the smoothness, e.g., with the profilometer or surface analyzer, are fairly well developed and are satisfactory down to a finish with an RMS value of about 2 microinches. However, large differences in brightness and reflecting power may exist on surfaces that are still smoother. Efforts now being made to define and measure brightness are promising but the results are not yet ready for application.

Figure 5. The spiral contractometer devised by A. Brenner.

Stress

While it has long been known that large stresses, usually tensile or contractile, may exist in coatings during deposition, the relation of stress to adhesion and to corrosion has been fully appreciated only during the last decade. Methods of measurement, such as Brenner's spiral contractometer, are now available for the control of stress.

Plating Specifications

Since about 1932 the AES and ASTM have cooperated in the preparation of specifications that have found wide application and are still being refined and improved. The net result is a great improvement in the quality and acceptability of plated coatings.

In the above brief review mention has been made of only a few of the many persons who have made specific contributions to this important field. Even more significant is the large number of persons and firms that have participated in the activities of the AES Research Committee and ASTM Committee B8 on Electrodeposited Coatings. The advances made in this field are splendid examples of the results of team work of those in our educational institutions, research laboratories, and industrial establishments. With such a background, we may well look forward to still greater progress in the next fifty years.

THE PLATER IN 1903

(*Concluded from page* 77)

tle cyanide of potassium and too much silver. In this case, the deposit, though adherent, takes place too slowly, and the bath loses more silver than it gains from the anodes. He should then add, with precaution, some cyanide of potassium.

If on the other hand, the anode remains white during the passage of the current, the proportion of cyanide of potassium is too great, the deposited silver is often without adherence, and the anodes lose more metal than is deposited. The remedy consists in adding the silver salt until it dissolves with difficulty.

Besides examination of the anodes, there is another simple and rapid process for ascertaining the state of the bath, and establishing the proper ratio between the silver and the cyanide. About a half a pint of the liquid is removed and introduced into a tall glass, and to this a solution of 10 parts of nitrate of silver in 100 parts of distilled water is added drop by drop. If the white precipitate produced is rapidly dissolved by stirring, the liquid is too rich in cyanide, or, what is the same thing, too poor in silver. Should the precipitate remain undissolved, notwithstanding prolonged stirring, the liquid is too rich in silver and too poor in potassium cyanide. Lastly, when the precipitate is dissolved but slowly, the liquid is in the best condition. The remedy for each of these deficiencies is obvious.

When a bath is in good working order, the operator should, by careful attention to hints and precautions herein given, strive to keep it so. Such attention will go far toward accomplishing this desirable result, but no amount of advice will take the place of experience."[4]

Such is briefly a story of the "old time" plater and what he had to work with. Yet the quality of the work produced in many cases was equal if not better than that produced today.

The Metal Industry started at a time when the electroplating industry was entering a new era. Methods for control of solutions, instruments for electrical control, dependable generators, automatic equipment, constructive literature, exchange of experience with fellow artisans! Compare these with the reversible generator of 1903, a galvanometer, a piece of litmus paper, a Baumé hydrometer, and a plating room considered as "a necessary evil."

References

1. Excerpts from "A Measure for Greatness" — a biography of Edward Weston by David O. Woodbury.
2. Practical Electroplating. W. L. D. Bedell. 5th Ed. (1923).
3. Practical Electroplating and Polishing. Zucker Levitt & Loeb Co.
4. Galvanoplastic Manipulations. W. H. Wahl.
5. Electrodeposition of Metals. C. Langbein—3rd ed. (1898).
6. The Practical Electroplater. Martin Brunor (1894).
7. Electroplating. John W. Urquhart (1905).

Fifty Years of Publishing

By Thomas A. Trumbour

Thomas A. Trumbour has spent his entire working life with Finishing Publications, Inc. and its predecessors. He started in September 1901 with the *Aluminum World*, published by Palmer H. Langdon, which later became *The Metal Industry*, and finally *Metal Finishing*. As business manager he has handled the finances of the company since 1903. He has advised and negotiated upon the purchase or merging of the many magazines that now are incorporated in the one publication. The publishers gratefully acknowledge the part his wisdom and judgment have played in making *Metal Finishing* what it is today . . . the leader in its field. He is an honorary member of the New York branch of the American Electroplaters' Society and has the distinction of being the only member who has attended every convention held by the society. He is permanent secretary of the International Fellowship Club (now the Metal Finishers Suppliers Association). To the industry he has been known affectionately as the "Platers' Friend" for nearly fifty years and it would be difficult to estimate the number throughout the industry who have reason to regard Tom Trumbour as a true friend.—*Editor*.

AN industrial magazine is many things to many people. It must cater alike to executives and workers, salesmanagers and maintenance men; all look for an answer to their problems. Through the course of time it begins to reflect the personalities of the people who direct it; the publishers, editors, and personnel who devote their lives to the trade they serve. Achievement is their criterion of success. They must move, not with the times, but ahead of them. Trends must be anticipated, warnings given, and injustices voiced. This calls for a wide and intimate knowledge of the industry; a knowledge that permits a true evaluation of the facts and the perception to draw the correct conclusions.

Thomas A. Trumbour
General Manager 1901-

In 1894 Palmer H. Langdon entered the field of industrial publications. He was associated with Frederick F. Burgin who founded the *Aluminum World*. In 1898 he purchased the magazine from Mr. Burgin and became editor and publisher.

If this had been Palmer Langdon's objective when he left school he could not have fitted himself better for the position he now occupied. As an apprentice he had worked at the Rhode Island Locomotive Works, then in the machine shops at Paterson, New Jersey. The Kinkly works at Boston came next and then the electrical factory of Frederick Kimball. During this time he continued his studies and when he came to New York he attended the first summer school ever held by Columbia University.

In 1892 the pattern of his future life began to unfold. He became a reporter on a New York daily and remained in journalism until he joined *The Aluminum World* two years later.

The practical knowledge and experience he had gained in industry was invaluable. When this was added to his trained ability to express himself it formed a combination rarely found in the editorial field in those days.

Like many others, he anticipated that aluminum would become a specialized industry. When he realized it was fast becoming a common metal he decided to enlarge the scope of his magazine. The name was changed to *The Metal Industry* in 1903 and devoted exclusively to non-ferrous metals.

Even in those early days he had faith in the future of electroplating and all available information on this subject was included. Every item pertaining to

this little known science was garnered from the world's press, from industry, and from discussions with individual platers.

Palmer Langdon had an uncanny knack of drawing to him men of ability with the same faith in the future of the industry that he himself possessed.

The first issue of *The Metal Industry* was published January 1903. It was edited by Erwin S. Sperry, a noted metallurgist, who joined the staff and became the first editor of the new publication.

Erwin Sperry was a graduate of the Sheffield School of Yale University who upon graduation was asked to remain as assistant instructor in chemistry. Later he engaged in industrial work and made a name for himself throughout the entire metal industry. He was regarded as the greatest living expert on electroplating.

It was natural with two such men directing the destinies of the magazine that it began to slant toward metallurgy and electroplating. The metallurgical field was established. It was a recognized subject in colleges and universities. Text books were available and anyone seeking information upon the science of metallurgy could obtain it from many sources.

The reverse was true about electroplating. The broad principles were known but it was not considered a subject worthy of inclusion in college curriculums. The lack of men qualified to teach even elementary electroplating would have prevented such a project from being established.

Fifty years ago skill was vested in the individual. The knowledge possessed and the discoveries made were jealously guarded and the individual craftsman of this infant industry hugged his scraps of knowledge to his bosom and disclosed his methods and solutions to no one. This situation continued for some years, despite the best efforts of *The Metal Industry*. The editorial columns harangued, cajoled, and pleaded for public spirited platers to come into the open and exchange information for the betterment of the industry, but progress was slow.

At this point a trend began to develop. A sound knowledge of chemistry was necessary to instruct and write about electroplating. A background in metallurgy was, of course, essential, and additions to the editorial staff were chosen for their practical industrial experience.

Louis J. Krom brought 10 years of practical experience to the magazine. He was a graduate of Lehigh University in chemistry and metallurgy, spent four years with Randolph and Cowles of Waterbury, Conn., and six years with the Chase Rolling Mills of the same city. He thus had the educational background to understand the problems and the practical experience of working side by side with those the magazine wished to reach.

The untiring efforts of publisher and editors began to have an effect. The magazine had never been published from an armchair, but now field work became predominant. The shape of things to come was evident to us who directed the organization and all our energies were centered upon proving that platers' self interest was irretrievably tied to electroplating industrial progress.

The First Association

In 1909 the first tangible result was seen. On March 6 of that year an Associated Foreman Platers' Association was formed. An extract from the editorial of March 1909 reads:

> "Matters had progressed to the point of producing a spark and it now rests with the platers of America to so foster that spark as to cause a fire strong enough to weld together all of the platers of this continent in one solid body . . . The meetings of the association will prove an incentive for the plater to tell of his troubles, and the practical problems there presented will be discussed and solved for the benefit of all . . . the study of literature thus manufactured, and now so scarce . . . "

Charles H. Proctor was now Plating Chemical Editor. He was an internationally known figure wherever plating was done. At the age of 12 he entered industrial work in England. He spent some time in Belgium leaving there to come to the U. S. in 1881. He brought with him an up-to-date knowledge of practical plating that was unsurpassed at that time. He had charge of the plating and finishing operations in various plants and during this time he studied chemistry until he was acknowledged the foremost expert in electroplating.

Mr. Proctor was elected first chairman of the new association and Krom was made a member of the committee.

In the same year the American Platers' Association was formed for: "All manufacturing platers and manufacturers and sellers of Platers' Supplies."

Through the vision and determina-

Palmer H. Langdon
Editor, Publisher 1901-1935

Charles H. Proctor
Plating Editor 1908-1935

Oliver J. Sizelove
Plating Editor 1928-1936

Mrs. Louise H. Langdon
Publisher 1935-

Adolph Bregman
Managing Editor 1919-1938

Dr. Walter R. Meyer
Editor 1938-1942

tion of a small group of far-sighted enthusiasts, an industry began to take shape. The objective fixed in 1903 had been achieved. Platers began to come into the open; to emerge from the basements — where most of the plating was done — and to mingle freely with each other exchanging information.

Charles H. Proctor is known as the founder of the American Electroplaters' Society which he organized in 1909, and of which he was the first president.

In the editorial section of the April 1909 issue the following paragraph appeared:

MONTHLY MEETING OF PLATERS

"At the first regular meeting of the National Association of Electroplaters of the United States and Canada, held April 10, 1909, at the Hotel Chelsea, 222 West 23rd Street, New York, it was voted to hold regular meetings on the first Friday of each month at 8 P.M. at the above mentioned hotel.

At this meeting the association designated *The Metal Industry* as its official organ."

In July practically the entire editorial was devoted to the Association.

PLATERS TROUBLES

"When the National Electroplaters' Association was formed last April it was predicted that nothing but lasting good could come of such an organization. In response to the earnest appeal of Charles H. Proctor for 'Mr. Plater to come out of his shell'; numerous 'Mr. Platers' have crawled out and a large number in addition have opened their doors and are listening, until . . . the association bids fair to become a power in the land and will be a most important factor in the development and uplifting of the electroplating and allied industries. The first results . . . are to be seen in the recent disctussion on 'The Excess of Arsenic in a Brass Bath,' . . . we also publish a paper read by Perry Brown which sets forth in a scholarly and scientific manner the essential points of the subject."

Mr. Proctor was the author of *"Platers' Wrinkles"* which appeared in serial form in *Metal Industry*. It was our opinion there was a vital need throughout the industry for such information. We had this written in a practical form explaining steps, processes, short cuts, etc., and indicating problems and their solutions.

The demand for this series continued long after the articles had appeared, and reprints were made.

This pamphlet of sixteen pages continued to be the most practical and authoritative work of its time, and 30,000 copies were distributed to trade engineers.

As the years passed the indelible imprint remained of the personalities associated with the magazine. The anticipated trends developed. The Association grew to a stature such as they predicted, and in 1912 changed its name from the National Electroplaters, to the American Electroplaters' Society.

Branches were organized in the major cities of the U. S. and Canada and the Association became international eventually when branches were formed in Australia and New Zealand.

In 1914, five years after the formation of the society the first convention of branches was held in Chicago. A convention has been held every year since that date.

The craft had become an industry, and *The Metal Industry* its voice. The publication fathered the growing industry. Its columns had always been open for free discussion upon the problems of the day, and now more than ever it encouraged controversial discussion. By this means the other side of the question could be aired and a true evaluation of the facts could be gained.

When plating problems arose they scoured the world for the answers. Any man with specialized knowledge, be he in the U. S. or in a foreign language country, was persuaded to write on his subject that readers could apply the techniques and improve their product.

The contents of the early issues reflected the need of industry.

In 1909 the contents included:

Immersion or Dip Gold Solution
A Method of Making Artistic Lamp Shades
Government Specifications for Manganese Bronze
Platers' Wrinkles
Transparent Metals
Copper Rolling Mill Practice
Silver Plating
The Production and Demand of Liquid Fuel
Visit of Mining Engineers to Connecticut
American Brass Co.'s Report
Soldering of Aluminum
Recovery of Precious Metals from Jewelers' Waste

INDUSTRIAL

New English Tilting Furnace
New American Tilting Furnace
The Air Brush in the Metal Trade
The Aero Chuck

EDITORIAL

Associated Foreman Platers
Manganese Bronze of Government Use
Standard Methods of Brass Analysis
Criticism & Comment
Complete Analysis of Brass
Nickel Plating, Weight of Deposit
Weight of Nickel Deposit
Shop Problems
Patents
Associations & Societies
Personals
Correspondence
Trade News
Metal Market Review
Metal Prices

The lamp shade article was indicative of the times. What we would term today a "How to do it" article. It explained in detail the five steps necessary to manufacture the shade and went on to say:

"In this way a lamp shade can be made that excels all others. The finishing is done by covering the solder with copper, brass, silver, or gold by electroplating. Before plating the shade with silver or gold, it should be plated with copper or brass. The plating is done in baths of ordinary composition and offers no particular difficulty. Most shades are copper-plated and then coated with a beautiful dark green patina, which shows off to best advantage . . . after plating and oxidizing, the shades are coated with wax or shellac to protect them against atmospheric influences."

A fairly even balance between metallurgy and electroplating was maintained with the accent on plating. The metal market was revised and metal prices given because this was the information the industry needed in its magazine at that time. Later, when this information was readily available elsewhere these items were dropped in order that the space could be devoted to material of greater value.

In 1909 in response to the number of American manufacturers seeking new markets and the need in Britain for a publication of so informative a nature, the following announcement appeared:

"Early in September there will be published in London an English edition of *The Metal Industry*, which edition will circulate in Great Britain and all of the British Colonies, except Canada.

Beginning with our August number all English and Colonial subscribers (except Canada) to *The Metal Industry* will be taken care of by the London office. The English paper will be similar to the present American edition of *The Metal Industry*, but also will contain English News, English market reports and English advertisements. For all American manufacturers of metals, machinery, and suppliers who desire to reach the British and Colonial markets, the English edition offers an exceptionally good opportunity, for no American publication can begin to interest English readers like a journal published in the United Kingdom. As there is no tariff wall in Great Britain, American manufacturers have an equal chance with the British . . ."

E. G. King of London, who is still active in the Publishing World, came over to New York to make the necessary arrangements.

The magazine continued to serve the metallurgical and electroplating fields. The association sponsored by *The Metal Industry* grew to maturity with branches in all major cities and an ever expanding membership. In 1925 *The Brass World* changed its name to *The Platers' Guide* and was merged in 1936.

Magazines in related fields merged or were purchased and *The Metal Industry* became the acknowledged leader of the field in which it operated.

At the end of the first world war Adolph Bregman became editor. This was the beginning of an association that lasted 19 years. His clear thinking, expression, and intelligent anticipation of future trends made an indelible mark upon both the publication and the industry.

A graduate of the Colorado School of Mines he specialized in metallurgy and for several years after graduation was engaged in smelting and mining operations in an engineering capacity with Wanakah Mining Company, the Columbia Smelting and Refining Company, and the Nichols Copper Company. He served with the army during the war.

Mr. Bregman had many interests. When he left the publication he organized the Master Electroplaters' Association of New York and became its secretary. He as associate editor of *Metal Progress* and contributed many tech-

Nathaniel Hall
Technical Editor 1942-

Willoughby G. Sheane
Editor Organic Finishing 1942-1948

Walter A. Raymond
Managing Editor 1947-1952

Joan T. Wiarda
Sales Manager 1938-

nical articles to such magazines as *Iron Age*.

The 25th Anniversary

In 1928, *The Metal Industry*, with which were then incorporated *The Aluminum World*, *Copper and Brass*, *The Brass Founder and Finisher* and *The Electroplaters' Review*, issued its 25th Anniversary number. The wide field covered at that time was revealed in the editorial.

"It has been the endeavor of *The Metal Industry* to be a representative publication of all of the branches known in metal fabrication, beginning with the ingot and ending with the finished product. Our publication has aimed to present the latest and best practice in every step of metal manufacture . . . we have sought in all of the industrial countries of the world, the best practical exponents of their respective branches of the metallurgical arts . . . the best possible shop practices of their day . . . Our experts have answered, in our shop problem department, over 3,700 questions . . . many more questions and answers have been published . . . in addition we have answered hundreds of questions by mail . . . We believe that the shop practice of the industry has advanced appreciably since the establishment of the shop problem department . . . as our unswerving aim is to issue a publication complete in every respect, this policy will be continued . . . in our advertising pages we have attempted to have every branch of manufacture represented . . . all advertising being refused which was not suitable for the publication . . . Our survey of the industry . . . and production value figures for pig iron in 1926 were about $750,000,000 and for metals, about $600,000,000."

The founders, staff, associate editors, and managers during this period made an imposing array of some of the best technical brains in the world. Palmer H. Langdon, founder, editor, and publisher. Edwin S. Sperry, first editor, S. D. V. Burr, managing editor until his death in 1908. Louis J. Krom, managing editor 1908-1919. Adolph Bregman, specialist in metallurgy and mining 1919-1938. Thomas A. Trumbour, business manager. George W. Cooper, advertising manager. Jesse L. Jones, metallurgical editor, who had in his charge the chemical and physical testing laboratories of Westinghouse. William J. Reardon, foundry editor, who had a record of over 40 years in the brass foundry industry. Charles H. Proctor, plating chemical editor. Oliver J. Sizelove, plating chemical editor. William J. Pettis, rolling mill editor. Walter A. Abate, brass finishing editor, and Peter W. Blair, mechanical editor.

Every editor had one thing in common, each had cut his teeth in industry. All had years of practical experience behind them, and each was a leader in his chosen field.

The field covered was enormous, by present day standards, but the need for such comprehensive coverage was still paramount. The contents for March, 1928, indicate the wide scope of the publication.

ANNUAL MEETING OF THE INSTITUTE OF METALS DIVISION"
Pewter for Rolling and Spinning
Standardization Progress
Mummy Preserved by Copper
The Development of the Aluminum Industry
Electric Smelting Advancement
Removing Lead from Babbitt
The Fundamentals of Brass Foundry Practice
Drawing and Stripping Silver-Plated Copper Wire
The Growth of Industrial Cleaning
Rapid Brazing
The Walrus and Metal Finishing
Plating Conference at Washington
White Silver Strike on Steel
To Study Time Saving
Meeting of the New York Platers

Palmer H. Langdon
Assistant Publisher 1936-

EDITORIALS
Institute of Metals Division Meeting
Platers' Meetings
The Building Industry
Price Cutting
The Prince Takes Up Jewelry
Walter L. Abate
Correspondence and Discussion
New Books Technical Papers
Government Publications
Shop Problems
Patents

EQUIPMENT
Physical Properties of Adnic
Ball Bearing Grinder
Pickling Solution Addition Agent
New Automatic Grinder
Chromic Compound Rack Covering
New Scratch Brush Sections
Horizontal Disc Grinder
New Red Protective Paint
Industrial Ovens
Spray Gun for Heavy Fluids
New Combination Grinder
New Hard Aluminum Alloy
Universal Tool Post Grinder
Equipment and Supply Catalogs
Associations and Societies
Personals
Obituaries
News of the Industry
Metal Market Review
Metal Prices
Supply Prices

In 1930 it was decided to publish a yearly handbook called the *Platers' Guidebook*. For many years "*Platers' Wrinkles*" had served as a guide for those within the industry who sought practical knowledge upon the practice of plating. By this time, however, the

booklet was out of date and its scope too limited to be of value.

The new handbook filled an industrial need and was an instantaneous success. It has been published each year since 1930 and has grown from a 16 page pamphlet to a text book of nearly 600 pages upon plating and related subjects. The title was changed later to the *Metal Finishing Guidebook Directory* which was considered to be a more accurate name for such a publication.

The New Publisher

In 1935 the industry suffered a severe loss by the death of the man who had done so much to promote its growth, Palmer H. Langdon. The future course of the publication might have been vastly different had not control been vested in one of the same high calibre, with similar vision and ethical standards. Mrs. L. H. Langdon, his wife, became the new publisher. It is difficult to estimate the extent her influence had upon the success of *The Metal Industry* during the previous 32 years of its life; that it was considerable was evidenced by future operations. Mrs. Langdon assumed the administrative reins, and being of high integrity herself she never doubted the integrity of those her husband had chosen to guide the destiny of the publication. At the numerous conferences necessary in all publishing operations to study trends and determine policy, her role was to clarify and evaluate. Rarely indeed did she state an opinion directly. When a controversial matter of major importance arose she would preface her decisions with "MY husband would have done . . ." In matters of finance Mrs. Langdon believed that the man who had handled the finances of the organization successfully since 1903 was capable of continuing without restraint.

The highest possible standard of trade journalism was maintained and she continued the policy inaugurated by her husband of permitting no connection with any manufacturer, supply house, or other supplying agency. Editorial and advertising were entirely divorced, and have remained so for 50 years.

Palmer H. Langdon II grew up in an atmosphere of publishing. During his vacations from Lehigh University from which he graduated in 1936 he worked on and for the magazine and during the summers in the laboratory of the Lea Manufacturing Company of Waterbury, Conn.

In 1938 Dr. Walter Meyer became editor. He received his Ph.D. from Yale University and brought to the publication a wealth of theoretical, practical and industrial experience. His wide knowledge of industrial requirements, gained from such organizations as General Electric Company, enabled him to foresee the road ahead. He could be regarded as the first really technical editor on electroplating and it was he who saw the need for more specific technical information. The industry had discarded secrecy, it wanted facts. It wanted to know "why" as well as "how" and Dr. Meyer supplied this knowledge.

One of Dr. Meyer's outstanding achievements was the introduction of an organic finishing section into the magazine. He had the vision to see how organic finishing complemented and supplemented the electroplated finish. How well his judgment was vindicated is demonstrated by the sister publication today, *Organic Finishing*. In 1945 the field became too large for one magazine and *Organic Finishing* was published as a separate publication.

Dr. Meyer resigned from the editorship when he left to join Enthone, Inc. of which he is president.

Metal Finishing

Trends were beginning to change by 1940. The age of specialization had become established and from a horizontal publication devoted to the wide field of metallurgy and electroplating it was decided to concentrate upon the industry it had helped to establish — electroplating. In 1940 it became a vertical publication devoted to electroplating and allied fields. The title was no longer representative of its contents, but the name desired could not be used as it was incorporated in the name of another publication: *Metal Cleaning and Finishing*.

This magazine was purchased in 1939 and *The Metal Industry* became *Metal Finishing* in June 1940.

This major decision had to be taken to do justice to the electroplating industry. It had grown from an infant groping around obstacles to a fully grown man. Industrial techniques had become extremely complex and trained chemical engineers were necessary where rule-of-thumb had prevailed previously.

When war broke out Palmer H. Langdon joined the Corps of Engineers. He spent 4 years in the services and returned with the rank of Captain. Upon his discharge he rejoined the publication.

Nathaniel Hall became editor and during this critical time his wide specialized knowledge was used to its fullest extent. Not only had he to obtain articles from men too busy to write, he had to combine with his editorial duties an advisory service for those whom the exigencies of war had brought into the industry.

These were days when one telephone enquiry might be so elementary a high school boy could answer it, and the next so complex that only a skilled electroplating chemist with a background of metallurgy could answer. To add to the editor's difficulties many of the problems, techniques, and processes were on the secret list. This information would have been invaluable to the finishing industry but it could not be

Inez Oquendo
Assistant Editor 1947-

John E. Trumbour
News Editor 1944-

Elizabeth M. Meyers
Circulation Manager 1936-

disclosed, and it became one of the many secrets entrusted to those who had never broken faith with their supporters.

In 1945 *Organic Finishing* became a separate publication with Willoughby Sheane editing the first issue. Sheane was a Rensselaer Polytechnic Institute graduate with a wide knowledge of the organic finishing industry. He brought with him, as well as practical and theoretical ability, an unbounded enthusiasm and faith in the future of "Organics." Under his editorship the magazine preserved an even balance between practical and technical articles. Willoughby Sheane visualized the industrial needs of the future; an organic finishing engineering magazine, and its success today is due to a large extent to the careful thinking and planning of those early issues. Mr. Sheane is now Technical Director of Zapon Division, Atlas Powder Company, Stamford, Conn.

In 1948 Walter A. Raymond joined the editorial staff of *Finishing Publications*. He brought an educational background as wide and varied as his industrial experience. He graduated from the Brooklyn Polytechnic Institute where he took chemical and metallurgical engineering. He had studied industrial chemistry, plastic engineering and had taught chemistry, and metallurgy in war training courses.

Mr. Raymond's industrial experience included service with such firms as Schick, Inc., Pitney Bowes, Inc., and Yale and Towne Manufacturing Company. He was eminently qualified, therefore to have his name included among those who had helped to shape the destinies of the electroplating industry.

Walter Raymond left the organization in 1952 to join Industrias Metalicas, Colombia, S. A. as Technical Director.

Mrs. Joan T. Wiarda, vice president of *Finishing Publications*, started her career as a secretary. Her work as an active committee member in the annual conventions of the American Electroplating Society has brought her in contact with industrial representatives of the finishing industry from all over the world. This experience, together with her knowledge of publishing, makes her particularly suited for the position of advertising and sales manager which she has held since 1938.

Among the correspondents who report the finishing news from the local angle is Fred A. Herr, Pacific Coast Manager. His has been an exciting, varied, and colorful life. Born and educated in St. Louis, Missouri, he became a reporter on the St. Louis Times. During his newspaper career he covered everything from crime to sports. At the height of the oil boom in California in 1922-24, Fred Herr was on the spot covering the news. Gradually his interests became focussed upon industry and during the last 12 years his by-line has been seen on many technical articles in the industrial trade press.

His journalistic experience gives to his writing that crisp concise touch so necessary in technical reporting.

Ever since Palmer H. Langdon entered the publishing field in 1894 a keen interest was held by the organization in industrial and business trends. Lower Manhattan was the home of the magazine for 39 years.

The next 11 years were spent in 42nd Street but a trend was developing among publishers of industrial magazines to decentralize and to establish editorial offices away from the city.

In 1952 *Finishing Publications, Inc.*, decided to follow the logical trend, and they established their headquarters at Westwood, New Jersey. This has become the center for information in the industrial coating field. Here the magazines are published and the larger premises permit the specialized library

Edward Finnie
Detroit Editor 1950-

of finishing literature to be made available to more visitors. A permanent exhibition is maintained of finishes and equipment. This permits the visitor seeking technical information to study the most suitable process, see the equipment necessary (either displayed or through the medium of manufacturers' literature), and then examine the finish obtainable by these means.

Half a century of publishing cannot be condensed into a few pages. We have tried to show how the founder's belief in the future of the electroplating industry was justified and the stages through which the magazine progressed as the industry developed. The publication was dedicated to service. When industrial trends indicated this service would become inadequate another milestone was left behind. The broad metallurgical field was discarded when it was found that justice could not be done to the two subjects. The industry gradually changed from the simple rule-of-thumb to the complex, highly technical organization it is today. As these changes were foreseen the format and contents of the magazine were changed in order to represent the future thinking and to give the technical help and advice so badly needed.

This is not just one magazine, it is the concentration of many and pinpointed to the needs of one specialized industry. No one man is responsible for its success. It results from enthusiasm, energy, belief, and vision; in its pages are reflected the personalities of many brilliant people who gave of their best that industry could have *Metal Finishing*.

Technical Developments of 1952

By **Nathaniel Hall**, *Technical Editor*

Cleaning

THE most important development in this phase of the metal finishing art was the application of radioactive tracer techniques. Hensley, Skinner & Suter[1,2] developed *basic data on metal cleaning operation* and determined the effectiveness of different cleaners by tagging a fatty acid type soil, such as stearic acid, *with radioactive tracers* and then measuring the rate of soil removal. Other tests for cleaner effectiveness were treated in the literature. Spring[3] described the *water-break type of test*, which is unsuitable for heavily soiled or hydrophobic surfaces, and Domingo[4] patented a method of *testing for organic contamination* by applying a solution, selectively absorbed by the organic material, and then exposing to the proper light band.

Preparation of zinc base die castings for plating was covered in a new tentative recommended practice standard of the American Society for Testing Materials.[5] *Cleaner life* and the factors affecting it were the subject of a paper by Hunt[6] while Dvorkovitz & Hawley[7] developed the novel method of *adding an alkali metal gluconate to cleaners* used in hard water districts for the purpose of inhibiting precipitation of calcium and magnesium.

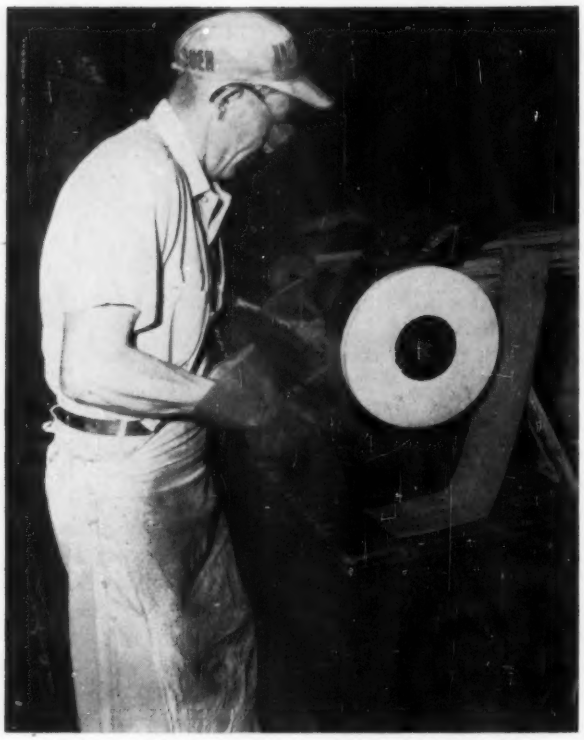
Solvent cleaning was discussed in one article worthy of note, a description by Jesson[8] of the equipment and technique for *efficient trichlorethylene degreasing*. However, the patent literature was slightly more active, with *solvent cleaners* patented by Secrist[9] and Pickett & Rosenfeld[10] and *equipment*, including spray units, by Flinchbaugh[11] and by Turpin.[12]

In the field of *abrasive blasting* Delaney[13] described the continuous removal of scale from hot rolled stainless steel strip by this process. The continuous line requires only 5 men as against 24 for the usual batch pickling installation but its biggest advantage is elimination of scale breaking operations. Sand blasting equipment (dry) was the subject of patents by Gladfelter[14] and Russell[15] while *liquid honing or wet blasting* was covered in an article by Everhart,[16] who outlined the process and its applications, the principle one being *preparation of surface for plating*, and by patents granted to Hamacher[17] and to Uhri.[18]

Pickling

Probably the most novel development was the *descaling of hot worked steel by induction heating*, which works on the principle of raising the temperature of the scale rapidly enough to cause expansion to a degree where it separates from the cooler base metal. According to Kincaid,[19] one of the important advantages is the *elimination of the waste acid disposal problem*. Alkaline pickling solutions, which should be of growing importance as the waste disposal problem becomes more serious, were treated in two patents, one to Holden on the use of a *fused bath of alkaline chlorides and fluorides* plus silicon carbon[20] followed by water quenching, and the other to Chapman[21] on an *alkaline electrolytic*

A typical plating solution analytical laboratory.



Workman is shown cleaning a saw blade with a felt wheel.

pickle containing cyanide, chloride, hydroxide and fluoride.

Of the more *orthodox pickling procedures*, the technical literature had nothing of importance to offer but the patent files were more productive, including two for the straight chromium stainless steel, to Caugherty for a nitric acid solution containing an alkali metal fluoride,[22] and to Kientz[23] for the method involving stretching the metal by cold rolling to form cracks in the scale and then pickling as usual. DeLong was granted a patent on a *pickle for worked magnesium*, comprising acetic acid plus nitrates[24] while Lorea & O'Rourke received one on a *solution containing cyanide and peroxide*,[25] which may sound slightly familiar, for pickling gold, silver, brass and other cyanide soluble metals.

The subject of *hydrogen embrittlement* was also given some attention during the year. An investigation by Jackson[26] confirmed that heating at 100 or 150°C. relieves the condition but, more surprising, *immersion in boiling water appeared to be appreciably more effective than heating in air*. Recommendations issued by the Coil Spring Federation Research Organization of Britain[27] include the *suggestion that oxidizing agents be added* to acid pickles to minimize hydrogen embrittlement.

Acid pickling inhibitors were studied by Halls[28] and new *organic materials* were found suitable for the purpose by Rucker,[29] Hill,[30] Hill & Shipley[31] and Cardwell, Eilers & Robinson.[32] A device for continuously adding inhibitors to pickling tanks was the subject of a patent issued to Bowman[33] and other patents in the field included a foam forming agent to keep spray down, consisting of a lignin sulfonate and invented by Carroll,[34] and a lifting device for raising and lowering strip in pickling tanks, claimed by McArthur.[35]

Polishing

Mechanical

An investigation of the *physical and chemical changes* accompanying the polishing of metals was published by Moore,[36] which showed the relationship between the phenomena of friction and the properties of a polished surface. The author reached the interesting conclusion that abrasives are primarily substances of high melting point, not necessarily of high hardness, which can cause high temperatures and hence surface flow of microscopic projections on the surface. Other articles in the technical literature were by Hunt, summarizing the *chemical and physical properties of buffing compounds*,[37] and by Colegate[38] describing, in detail, procedures for various metals.

Belt polishing, although its applications have become very widespread in recent years, received only slighting treatment. Patton[39] showed how continuously moving strips of stainless steel could be brought up to a mirror finish with *polishing belts*, boosting production. Hyler described the uses for *industrial coated abrasives*[40] and Newcomb outlined the mechanics of *polishing aluminum*, employing coated abrasive belts.[41] A patent was also granted to Bell[42] on a belt polishing attachment for polishing lathes.

Although it does not seem possible that much improvement could still be made in *buffing wheels and sections*, the patent literature produced developments by a large number of inventors including Hall,[43] Seelenfreund,[44] Sax,[45] Lawlor,[46] Bruner & Shaffer,[47] Monger,[48] Leslie,[49] Tullo,[50] McAleer[51] and Schlegel.[52]

Other patents were granted to Burt[53] for a *glazing and polishing machine*, to Wallace[54] for a machine for polishing continuous metal strip and to Schenk[55] for a machine for finishing bearing races. *Dust collectors* were claimed by Gilmore[56] and by Vedder for a bag type.[57]

Electrolytic

On the theoretical side Hoar & Farthing[58] offered evidence of the *presence of a solid film on copper* and alpha brass during electropolishing in 50/50 phosphoric acid, while the experimental study of Edwards[59] indicated that the *rate of metal dissolution*, in the cases investigated, is diffusion controlled.

Along practical lines, Perryman[60] recommended the *addition of sulfuric acid to the phosphoric acid solution* usually employed for copper and its alloys. Electrolytes were patented by Eaton,[61] covering a cyanide solution for silver, copper, cadmium and their alloys, employing current fluctuation by agitating the anode and changing the agitation rate cyclically; by Kreml, who claimed a *sulfuric-glycolic acid* solution;[62] and by Charlesworth,[63] who suggested the *addition of aniline to the sulfuric-phosphoric solution*. Kreml also received a patent for a *top loading rack* for use in electropolishing.[64]

Chemical

What was formerly known as *bright dipping*, has reached a position of importance probably never anticipated a decade ago. Chemical polishing of *iron* is the

latest accomplishment in the field. In a classic prize-winning paper,[65] Marshall reported the results of his investigation of a solution consisting of *oxalic acid, hydrogen peroxide plus a very small amount of sulfuric acid*. In further studies of this process by Hickling, Marshall & Buckle,[66] it was found, by electrochemical methods, that the *passive film produced in the polishing solution* was probably 16 molecules thick. For *soft iron with less than 0.05% carbon*, Beaujard[67] suggested a solution consisting of 30 parts nitric acid, 70 parts hydrofluoric acid and 300 parts water at 60°C.

Five solutions were patented during the year for *chemical polishing of aluminum*. One, noteworthy because of its *relatively low concentration* was developed by Hesch,[68] consisting of nitrate, fluoride, chromate, phosphate, ammonium ions and ions of a metal more electropositive than aluminum. Others claimed were: a solution of *nitric and phosphoric acids plus a wetting agent* issued to Heinrich & Fideor,[69] a solution containing *hydrofluoric and nitric acids plus trivalent chromium*, claimed by Hesch[70] who was mentioned above, a hot mixture of *water, ammonium bifluoride, nitric acid, chromic acid and ethylene glycol* issued to Eby[71] and a *phosphoric acid-peroxide mixture* developed by Cochran.[72]

Aluminum - Plating and Anodizing

The only significant article on plating on aluminum was a description of the *Vogt process* by Wallbank.[73] This process, which would be considered outdated, consists of electrolytic deposition of a zinc film from a low metal-high caustic bath, followed by a brass plating and then deposition of nickel from a low chloride bath.

Contrary to the trend exhibited in the subjects already covered, only one patent was granted in the field of anodizing, on the addition of *1% beryllium sulfate to a 15% sulfuric acid bath* by Sonnino,[74] while nine articles of interest appeared in the technical literature. The preparation of *light-sensitive films* suitable for photographic reproduction appears to be of cyclic interest to investigators. Those who remember the "*Seo-Photo*" process developed by Siemens & Halske in Germany in the early 1930s will note the similarity in the process reported by Wainer.[75] Another process, details of which are similar, was presented by Kirillov & Kheynman[76] while a modification, suggested by Alemeda,[77] consisted of *applying blue-print solutions to the anodized aluminum* surface.

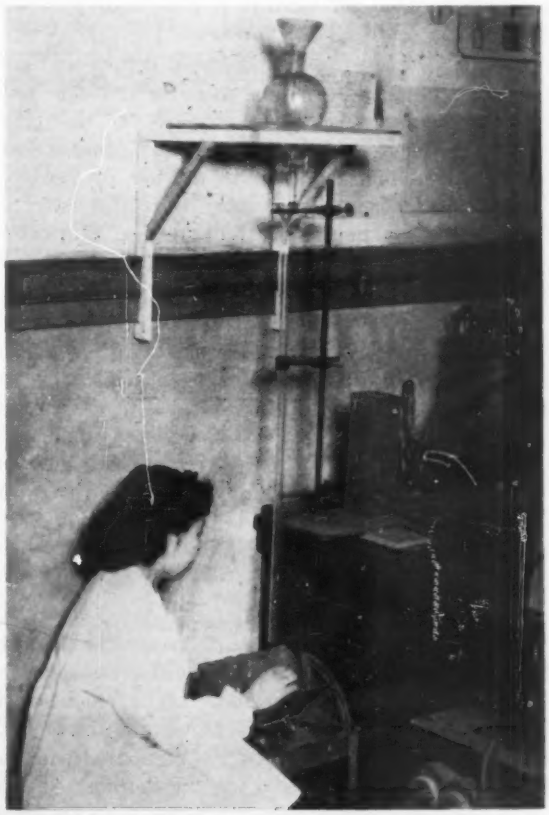
A *comparison of the sulfuric, oxalic and sulfamic acid processes* was made by Tajima, Kimura & Fukushima[78] in which AC, DC, and DC with superimposed AC were employed. Tajima also described the *oxalic acid process*, which is used extensively in Japan for finishing kitchen utensils, including a complete review of the process together with experimental data.[79] In an investigation of the *effect of air agitation* in sulfuric acid baths, Spooner[80] found that the temperature of the metal-solution interface was altered to a considerable degree, thus influencing the characteristics of the coating. Comparison tests of *wear and abrasion resistance* of hard anodized coating processes were made by VandenBerg.[81] The literature on *coloring and sealing* of anodized surfaces was reviewed most effectively and thoroughly by Wernick & Pinner[82] and Lewsey developed a method for *dyeing chromic acid anodized surfaces*[83] which differs from the method of Tubbs in that a lower voltage and slightly higher temperature are employed to produce oxide deposits of 0.00015-0.0002 inch thickness.

Metallic Coatings

Nickel

From the fact that only one patent was granted during the year on a nickel brightener, it would appear that researchers must be pretty well satisfied with the present status of bright nickel solutions. The single patent was on solutions containing *sodium carboxymethylcellulose*, claimed by Liger[84] to be suitable also for cadmium solutions.

What was probably the most important published work in recent times on the subject of nickel deposits was the investigation by Brenner, Zentner & Jennings[85] on the *effects of plating variables on the structure and properties of the deposit*. The important conclusion was that the properties of an electrodeposit are determined primarily by the chemical and physical nature of co-deposited impurities. An A.E.S. project studied the *effect of iron and zinc contamination*, during which Ewing, Brouwer & Werner[86] found, surprisingly, that iron up to 200 ppm. doesn't appear to deleteriously affect adhesion, brightness, throwing power or salt spray resistance, while zinc in amounts up to 300 ppm. improved the brightness of organic brightened nickel solutions. Marchese found[87] that superimposition of 60 cycle AC on direct current in a Watts type nickel



Measuring device for abrasion resistance of anodized films. Carborundum particles are falling upon the inclined surface of the specimen through glass tube.

bath resulted in *stresses as low as 2,000 lbs./sq. in.* This may have an important application in the electroforming of radar plumbing with minimum distortion.

The industrial processes for deposition of nickel were reviewed by Wesley[88] and the operating details connected with the production of *heavy deposits for equipment handling corrosive materials* were outlined by Savage, Graham & Strothman.[89] *Hardness as high as 450 Vickers* was claimed for a nickel solution containing a *phosphite* addition by Knapp & Carr[90] while, for good joints with nickel-chromium type stainless steel, deposition of nickel followed by sintering at about 1,000°C. was advised by Korbelak & Okress[91] prior to hydrogen furnace brazing. A rather unorthodox but successful cycle for *nickel-chromium plating watch cases*, was reported by Spicer,[92] including cold electrolytic cleaning and room temperature operation of a sulfate type chromium bath. Patton[93] investigated attempts to maintain *bright finishes on automotive hardware* while conserving nickel and concluded that no good substitute finish was available.

Copper

Results of tests by Shreir & Smith[94] were found to support the view of Blum & Rawdon that *cathode polarization is related to crystal size* and change from a coarse to a fine structure is accompanied by an increase in polarization potential. Polarization was also a factor in the studies of Gauvin & Winkler[95] in which measurement of *specular reflectance* of copper deposits indicated that any change in plating conditions leading to increased polarization increased reflectance. Their results indicate that reflectance measurement can be used as a method for control of gelatin or glue concentration in acid copper solutions.

Regeneration of copper cyanide in copper and copper alloy plating baths by the use of *diaphragm cells*, employing derezinized cypress panels as the membranes, was suggested by Binai,[96] the problems encountered and their solution in the use of a *copper strike on zinc base die castings* were discussed by Hauseman[97] and the physical properties, fabrication and applications of *copper clad aluminum* were described by Everhart.[98]

On the subject of *copper brighteners*, Gauvin & Winkler[99] found that, in the presence of more than the minimum concentration of chloride in acid baths, use of *gelatin as an addition agent* results in powder formation at the anode ($CuCl + Cu^{\circ}$). Small amounts of chloride in the presence of *acetyl thiourea*, however, was claimed in a patent granted to Beaver,[100] while *organic brighteners* for cyanide copper solutions were patented by Reisinger[101] and by Passal.[102]

Chromium

Among the unconventional baths treated in the technical pages were the *fluoride and fluosilicate solutions* which were discussed by Hood.[103] The efficiency is higher and the throwing power better than in the sulfate bath. Another bath, which was compared with the conventional one by Taylor[104] was the *Bornhauser solution containing sodium tetrachromate.* Hackerman & Jensen[105] found that the addition of relatively large amounts of *indium sulfate* to the standard 33 oz. chromium bath resulted in the production of deposits with no more than a few fine cracks, while the deposition was permissible at *lower temperature and higher current density than normal with less roughness than usual.*

Tests on the *corrosion resistance of hard chromium deposits* by Ricks[106] indicated that the finish of the base should be as smooth as possible and the deposit should be at least 0.0005 inch thick. A description of the method of *hard chromium plating of aircraft parts* was presented by Close,[107] and Mayer-Rassler recommended using either a zincate dip or a nickel chloride etch[108] for producing a *bonding surface on aluminum.* By air blowing bumpers before and after chromium plating, spray rinsing and concentration of rinse waters for return to the plating tank, an *installation for chromic acid recovery* costing $10,000 paid for itself in three months of operation, according to Keller, Cupps & Shaw.[109]

Patents in this field were not many last year, consisting of a *porous chromium plating and etching process*, claimed by Wilsdon,[110] a *method of purification to remove iron and trivalent chromium* patented by Sagen,[111] and a *one piece lead anode* covered by DeQuasie & Eisenberg.[112]

Tin and Zinc

Extension of researches on *embrittlement of plain and stainless steel* during plating to alkaline tin baths indicated no difference due to addition of acetate or peroxide, or operation at higher alkalinity, according to Zapffe & Haslem.[113] Tin coating was found by Hannon[114] to minimize *atmospheric stress corrosion failure* on power line hardware and the production of *lustrous steel music wire* by applying a thin tin deposit from an acid sulfate bath, followed by drawing to size, was claimed in a patent issued to Leonard.[115]

Two interesting patents were granted during the year, one on the *removal of the palm oil film from hot-dip tin plate* before cooling by passing into soda ash solution, claimed by Murphy,[116] and a *method of reducing iron carbide on the surface* of tinplate stock by annealing in contact with a non-oxidizing, decarburizing atmosphere containing nitrogen and a small amount of hydrogen was patented by Crego.[117]

An investigation, employing X-ray diffraction methods, by Gilbert[118] determined that *zinc oxide* is formed *when the metal corrodes in hot waters* and *zinc hydroxide* or basic zinc salts in *cold waters.* The preparation and maintenance of zinc plating baths *using substitute methods and metal salts* other than the usual zinc cyanide was described by Diggin,[119] and the deposition of *adherent zinc coatings on uranium* was found practicable by Silverman,[120] who employed a predip in Carbitol (ethyl ether of diethylene glycol).

Patents issued were for *brighteners in cyanide zinc baths*, consisting of *stannate and a ketone*, claimed by Wernlund,[121] and the *reaction product* of ammonium thiocyanate, dicyandiamide, caustic and formaldehyde, claimed by Hoffman.[122] For *acid zinc solutions*, the reaction product of thiourea, zinc oxide and an aldonic acid was claimed by have a brightening effect by Chester[123] and a *lead anode* alloyed with small amounts of silver and copper was patented by Isherwood.[124]

In the field of *hot galvanizing*, Bablik, Gotzl & Kukaczka[125] presented a new theory of the *mechanism of the formation of zinc coatings* during the galvanizing process, and two patents were granted, one for a *flux dam* for the hot galvanizing pot to Bechter[126] and the other to Morrison[127] for a method of *recovering zinc from skimmings*.

Silver

Along theoretical lines, the *crystal orientation of electrodeposited silver* was studied by Layton[128] in order to determine more closely the factors influencing their growth and the nature of bright silver deposits; and the probable *chemical compounds formed in cyanide plating baths* were investigated by Arblaster.[129] Eaton, Fabian & Newton[130] answered an old question when they demonstrated that the sulfidic sulfur atom of *ammonium thiosulfate brightener* attaches itself in some form to the silver surface, employing radioactive sulfur for the study. *Potassium selenite* was patented as a brightener for silver cyanide baths by Wolfson & Thomson[131] and Mohler outlined the *effect of the bath ingredients* on the results obtained from cyanide baths.[132]

Iron - Other Metals

Electron diffraction investigation by Evans & Hopkins[133] of the *structure of electrodeposited coatings* in single iron crystals emphasized the importance of the effect of plating solution composition upon the structure of the deposit. Iron *plating of stereotypes from fluoborate solutions* was described by Koessler and Sloan[134] with full details and a discussion of the advantages and disadvantages of this metal. It was stated that two million impressions had been obtained. One patent was granted on the production of *electrolytic iron from leached ore* to Konrad & Kaye,[135] and another to Konrad & Eustis[136] on its *deposition in continuous strip* by plating on a rotating cylinder coated with colloidal graphite, directly from the purified leach solution.

Bauer described a method of producing *heavy deposits of gold* (0.010") at about 100% cathode efficiency from high concentration cyanide baths containing vanillin and potassium sulfite as addition agents.[137] Accumulation of potassium carbonate, however, limited the life of the bath.

Patents were issued or applied for on other metals, including one on *deposition of uranium from a fused mixture* of the trihalide, preferably tribromide and other halide salts, which was applied for by Eastman.[138] *Arsenic deposition* was claimed by Chester[139] to be possible in uniform thickness from a sodium arsenate solution by superimposing asymmetric alternating current on the DC; and *thick rhenium deposits* were claimed on a refractory base by depositing a thin layer of amorphous metal, transforming it to the crystalline form by heating and repeating as often as required. The last was granted to Levi.[140]

Aluminum

Although produced only on a laboratory scale, *deposits of aluminum up to 0.020 inch thick* were shown to be possible by Couch & Brenner from a solution of aluminum chloride and lithium hydroxide in ethyl ether.[141] The process was shown to be suitable for electroforming radar sections.

Murphy covered the *history and recent developments* in the art,[142] his descriptions including both the organic and the fused baths. Other authors reviewed the various methods of *coating other metals with aluminum* and, in addition to the above electrodeposition methods, other procedures such as hot dipping, vacuum metallizing and calorizing, were described by both Hood[143] and by Smith.[144] The method of *hot dipping*, developed by General Motors was described by Patton.[145] In this method steel and cast iron are successfully coated with aluminum by using a molten flux of chloride, fluoride and cryolite. *Continuous hot dipping* was possible with minimum oxidation of the aluminum bath by adding beryllium. This was discussed, along with the effects on the mechanical properties, by Russell.[146]

Alloys

White brass, which has been making some progress as a substitute for scarce nickel, was covered in a number of articles, typical of which was one by Knight.[147] Other data published during the year comprised mainly the results of investigations rather than practical production methods. McElwee & Holt studied deposition of *cobalt-tungsten-molybdenum* alloys from acid citrate baths[148] during which they obtained deposits which were rather soft and could be scratched with a file, although consisting of 66% cobalt, 21% molybdenum and 13% tungsten. In another investigation connected with tungsten, Clark & Lietzke[149] studied the *mechanism of tungsten alloy plating*. Their findings indicated the possibility of *cobalt tungstate complexes* in the citrate bath. Ammoniacal citrate baths were employed in the deposition of *alloys of rhenium-iron* and *rhenium-cobalt* by Netherton & Holt.[150] Preliminary investigations by Cuthbertson & Parkinson[151] showed that bright deposits of an *alloy of tin with up to 45% antimony* could be satisfactorily deposited from chloride solutions containing fluoride as the complexing agent and with organic addition agents present. The applicability of this alloy to the bearing field would indicate the desirability of further study.

There were three patents granted on alloy methods. *Cadmium-tin* alloys from an acid fluoborate bath was claimed by Gray and Paecht,[152] *alloys of molybdenum with cobalt, iron or nickel*, using citrate-sulfate baths was covered in one granted to Holt & Seim,[153] and alloys of *zinc-copper-tin* were claimed by Shockley[154] from a caustic-cyanide solution, using an anode of 90% zinc, 8.5% copper and 1.5% tin, the metal contents of the bath being of the same composition.

Machines and Methods

The paucity of information on the subject of barrel finishing was very evident, the patent literature showing only one patent on *a plating barrel*, granted to Newman,[155] and the technical literature bringing to light nothing of importance.

Among the automatic plating machines, however, the patents were somewhat more common. Full *automatic units* were patented by Ransohoff[156] and by Curtis[157]

Unloading tubular steel parts that have been bright honed in the barrel shown. In general, both parts and limestone chips are dumped onto a hand screen. Chips drop into the pan below when the screen is shaken.

while machines for *continuously plating metal strip* were covered in patents granted to Wilson,[158] Kompart,[159] Keller[160] and Rieger.[161] For those who have been considering the application of *conveyorized lines* in their plants, a very informative discussion was presented in great detail by Schulze & Bonem.[162] Other developments included a process of partly forming wire before plating and then severing *zipper blanks* from the wire after it is plated, claimed by Cohn[163] and a method of plating an object by moving it thru a non-conducting tube of new design while pumping solution thru the tube, patented by Kushner.[164]

Electrical matters received nowhere near the attention they deserve. A very informative article by Caplow & Sussman[165] covered *brush selection and general maintenance of motor-generators*, and Brigham[166] presented the results of tests on the *aging characteristics of selenium rectifiers*, which indicate that this aging is very gradual and is dependent on the current load conditions. Premature aging was found to be due to overloading, high room temperature, improper cleaning and ventilation and contaminated air. A new development in the use of periodic reverse was claimed in a patent issued to Mackey & Swalheim,[167] involving the use of somewhat longer cycles than usual, such as 50-80 seconds direct and 15-30 seconds reverse, stated to result in more brightness in the low current density areas.

Electroforming

The most important item to come our way in recent years in the field of electroforming was the production, for the first time, of *aluminum wave guides*, using organo-aluminum baths. Safranek, Schickner & Faust[168] easily obtained deposits of 0.040 inch with the use of addition agents, as compared to a maximum of 0.002 inch obtainable only a few years ago. Superimposed AC and a nitrogen atmosphere were required, however. Two of these authors, Faust & Safranek also presented a paper[169] discussing the *processes, costs, properties and applications* of electroformed metals, while more generalized comments on electroforming to produce *precision metal components* on a production basis were made by Rice.[170]

Actual product manufacture by this process was detailed in an article on *copper tooth models* by Krumbeck[171] and in two patents, one to Grant for the production of *seamless iron tubing* on a steel form[172] using a lead film which permits stripping when melted, and the other to Stoddard[173] for *wave guides, plated over a fusible form* to which is applied deposits of copper, silver and nickel. After building up the nickel deposit to the desired thickness, the matrix is melted out and the copper layer dissolved by immersion in an ammoniacal cupric salt solution.

Production of the *conducting film* was the subject of one article and three patents. Upton, Soundy & Busby[174] determined the most efficient operating conditions for producing *silver conducting films* by spraying a silver solution and reducer, and Kantrowitz, Gosnell & General[175] were granted a patent on a process for *silvering plastic electrotype molds*, involving sensitizing with a lower aliphatic alcohol solution of tin salt, followed by spraying with the usual silver solution and a *reducer consisting of triethanolamine plus formaldehyde or glyoxal*. The other patents were granted to Gaiser for a method of applying a silicate solution to glass, heating to the softening point and then applying a tin halide in fluid form,[176] and to Watkins & Gaiser for immersion of the glass near the softening point in liquid tin halide[177] followed by plating.

Vacuum and Vapor Processes

High vacuum metallizing processes were described by Brown[178] and production of *decorative finishes* by Carr.[179] The former also detailed the method of applying a *bright finish to die castings*[180] by lacquering the raw casting to produce a glossy surface, evaporating a metal film and then relacquering for protection.

Tolansky[181] compared the *operating requirements and the properties* of metallic coatings produced by thermal evaporation and by cathode sputtering, while Ells & Scott studied *cathode sputtered silver films* with the electron microscope[182] in order to correlate the structure and physical properties with data on evaporated films. Vacuum metallizing equipment was the subject of a patent issued to Weber & Johnson[183] and a machine for *coating continuous non-metallic strip* was patented by Godley.[184]

Vapor phase coatings by *decomposition of volatile metal halides and carbonyls* has intrigued researchers for many years but operating difficulties have mitigated against wide application of the processes. Powell & Campbell[185] discussed the decomposition of metal halides at elevated temperatures, with details concerning the *effects of variations in operating conditions*, physical properties of the coatings and the effect of impurities.

Equipment for *plating strip metal* on a continuous basis involving heating of the strip internally by electrical resistance means was patented by Toulmin.[186] *Spraying the liquified, heat decomposable metal compound onto the heated surface* was the subject of a patent granted to Davis & Belitz,[187] Roush patented a process for *chromizing copper-infiltrated powdered iron compacts,*[188] and Lander received a patent on a method employing *decomposition of metal carbonyl* vapors.[189]

Conversion Films - Corrosion Prevention

Radioactive tracers, which are proving a valuable tool for determining traces of elements, were used to good effect in answering some of the questions which have arisen in connection with the phosphating process. Employing radioactive iron in their investigation, Eisler & Chamberlain[190] showed that *iron from the phosphating solution becomes an integral part of the film.* The *effectiveness of the chromic acid rinse* after phosphating was also evaluated with this procedure by Eisler & Doss,[191] indicating a distinct advantage in using a mixture of *equal parts of chromic and phosphoric acid* in the rinse. There appeared to be a chemical adsorption of the chromate on, or a combination with, the phosphate coating.

Tentative procedures for analytically determining the *nature and uniformity of phosphate coatings* on steel were developed by Preston, Settle & Worthington[192] and a *new phosphating solution* comprising alkali metal acid phosphate and an oxidizing agent, such as nitrite, sulfite, chlorate and bromate, was patented by Gibson.[193]

Mustin[194] summarized *surface treatment in naval aircraft production,* reviewing the background data leading to present specification requirements. In tests on *chromated cadmium,* Beck[195] varied temperature and time, finding that higher operating temperature favors harder chromate films, while bright cadmium deposits gave a harder film than dull ones. Patents included *passivating zinc and cadmium* by dipping in weak nitric acid, followed by immersion in alkali dichromate solution containing a wetting agent, claimed by Thomson,[196] a *galvanic method* of producing a protective film on *magnesium* in an acid solution of metal chromate, patented by Freud[197] and a *film on aluminum* by treating, according to Goldowski,[198] at elevated pressure with steam, preferably in the presence of an oxidizing agent and an electrolyte.

A novel method for *preventing staining of tinplate* and increasing paint and lacquer adhesion was disclosed in a patent received by Neish.[199] The article is made *cathode in an acid solution containing alkali metal chromate* to partially reduce the oxide film and then anodic to reoxidize the tin surface and to form a water-insoluble oxide-chromate film. A flocked *cloth impregnated with tarnish preventive compound* to protect silverware was patented by Prew.[200]

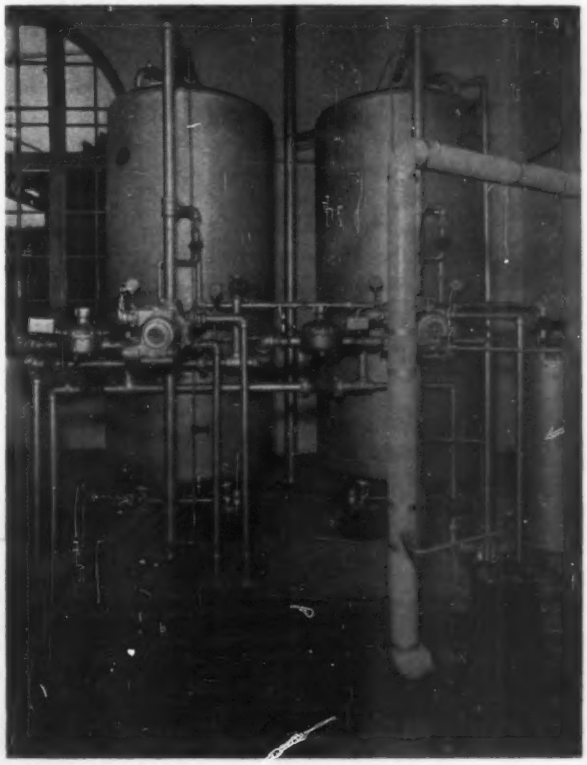
Organic corrosion preventive compounds were relatively prominent in the patent literature. New products were claimed by Walker & Dieman[201] and by Kleinholz[202] based on *hydrocarbon vehicles;* Costello[203] patented an easily removable product consisting of *soybean, sperm and linseed oils;* McCue & Broom[204] claimed a *wax solution;* and *water displacing* and *water emulsion* types of rust preventives were claimed by Galvin & McAuley[205] and Michel & Hager[206] respectively.

Wash primers, which are zinc or lead chromate primers with added phosphoric acid, were discussed in two excellent articles. This type of treatment would be considered chemical rather than an organic finish because the thickness of the film is only of the order of 0.0002 inch. Alexander[207] indicated that results of tests suggest that *mild rust,* from which all soluble material has been removed, *should not be a difficult surface to paint* because treatment with wash primers produces a surface outlasting one cleaned by sandblasting. Ffield[208] made a very complete analysis of *ship bottom corrosion,* coming to the conclusion that the role of mill scale is more influential than generally suspected and that wash primers are most effective in preventing paint blistering on descaled steel.

Testing and Control

A paper on the *determination of fluoride and fluosilicate* in chromium solutions by Oosterhout & van de Velde[209] indicates to us that convenient and reliable methods are still needed for analysis of these catalysts in the presence of sulfate, iron and other ions. However, the *radioactive isotope dilution method* described by Eisler[210] gives promise of offering quicker results with precision and accuracy in the determination of *sulfate,* than the usual gravimetric procedure with barium sulfate precipitation, which gives high results. A formidable outlay for equipment would be necessary, of course.

Rapid titration of *magnesium in nickel solutions* is possible by a method suggested by Langford,[211] using ethylene-diaminetetraacetic acid sequestering agent and



Typical ion exchange installation for treating and recovering chromic acid.

Erichrome Black T dye as an indicator. A *nomograph, which simplifies nickel chloride and nickel sulfate computations* in the analysis of the Watts type bath was presented by Goldman.[212] Colorimetric procedures for the *analysis of cyanide, thiocyanate and cyanate* in plating wastes, which are chlorinated, were found by Kruse & Mellon[213] to be sufficiently sensitive for the minute amounts usually present but Marks & Chamberlin pointed out[214] that the applicability of a given method for *determination of the residual chlorine* depends on the composition of the waste and whether the cyanide is to be oxidized only to cyanate or all the way to carbon dioxide and nitrogen.

A *meter* for determining the thickness of electrodeposits *on moving strip* was patented by Rendel.[215] Schlaupitz & Robertson[216] measured the *adhesion of deposits* quantitatively and demonstrated that it is possible to cause non-ductile fracture in annealed copper foil when design of the test specimen is such that a tri axial state of tensile stress is obtained. The method developed can be adapted to electrodeposits. *Salt spray tests were considered unreliable* by LaQue except possibly for gross defects,[217] but we are still waiting to see specification writers take notice of this conclusion. Other articles on the subject of testing included one describing the *calibration of slot type plating range cells*, by Mohler[218] and another by Kushner,[219] who explained his *surface tension control* development based on capillary rise of liquids between two inclined glass plates.

Plating Room Wastes

The growing importance of this subject is evidenced by the amount of space taken up in the technical and patent literature. Graham & Pinkerton[220] drew the distinction between plants discharging wastes into public waters and into municipal sewers and Murdock surveyed the *various treatment methods for decomposing cyanide wastes.*[221] Chlorination is the most common method and typical of this process is the description of the Ford Motor plant in Monroe, Mich. by Cox[222] who indicated that *treatment time and chemical cost can be reduced if suspended solids are eliminated before chlorination.* The older method of *volatilization of HCN by means of acid additions* was investigated by Dodge & Zabban[223] to obtain figures on the optimum operating conditions. They found that the rate of volatilization from an aerated solution is mainly a function of initial HCN concentration, rate of aeration and temperature. The *pH does not have any effect* as long as most of the cyanide is present as HCN (pH somewhat less than 3.5).

Ion exchange methods have been found excellent, not only for removal of metals from processing solutions, but for their recovery and return to the processing tank. Paulson surveyed this field in one article[224] and discussed, in another, the specific cases of *chromate recovery from rinse waters* and impurity removal from chromium plating and anodizing baths.[225] This type of recovery installation at the Ternstedt Division of General Motors was stated by Fadgen[226] to permit returning uncontaminated waters to the plating room, thus *reducing the amount of waste water discharged to the sewer.* Studies on *brass and copper mill wastes* by McGarvey, Tenhoov & Nevers[227] indicated that profitable *recovery of the copper* might be accomplished in conjunction with electrodeposition in the pickling solution itself, by concentrating the solutions of metals with an ion exchanger.

Iron pickling mill wastes also received their share of attention, as in past years. Neutralization with lime having a CaO:MgO ratio of about 96:4 was found by Clauss & Brownell[228] to give the best rates of filtration for the neutralized slurry. Addition of *ammonia gas and air under pressure* was another method suggested in a patent granted to Tiddy & Cooper[229] but, in recent years, more emphasis has been placed on removal of the dissolved iron so that the pickling solution could be regenerated rather than discarded.

Processes for *recovery of the sulfuric acid* from waste pickle liquors were discussed by Mulcahy.[230] Bartholomew[231] described a *new method of supplying the heat* for concentrating the liquor, in a paper covering the recovery of acid by salting out the ferrous sulfate and decomposing it to recover its acid values, while a patent covering a process of this type was granted to Swindin.[232] Electrolytic treatment for *recovery of iron and regeneration of the pickle* was the subject of patents granted to Horvitz,[233] Heise, Schumacher & Wilson,[234] Oliver[235, 236] and Wilson.[237] The original patents may be referred to for details.

Miscellaneous

Coloring of metals is rapidly getting to be a lost art, like sand bobbing and hand burnishing. However, the slight activity during the year, in the patent field only, brought forth an improved solution for electrolytically reducing cuprous oxide films to produce *patterns or designs,* claimed by Stareck[238] and a process for producing *multicolor effects on anodized aluminum* by printing with a stop-off ink containing one color and then dyeing the balance of the surface with a different dye, after which the ink is removed. This process was patented by Rice.[239] An improvement in the fused dichromate process for *coloring stainless steel black* was patented by Kreml[240] and a new method for producing a *black color on magnesium diecastings* was claimed by Fischer,[241] comprising brightening in a nitric-chromic-hydrofluoric acid bath, hot alkaline dipping and then immersion in a solution of potassium chrome alum and dichromate to produce the black color.

Miscellaneous subjects treated in the literature were a method for *stripping* a combination of any two metals of the group consisting of copper, nickel, chromium, gold and silver from an iron base with reverse current in a phosphoric acid solution, developed by Stuffer;[242] a *washer type anode,* in which Wagner[243] stacked the discs on a central spine; and a discussion of the *risks associated with various metal finishing processes* by Murray.[244]

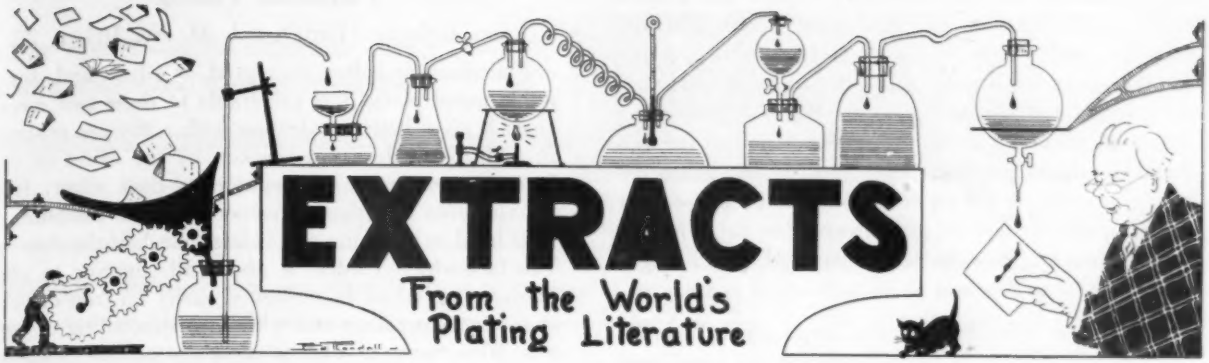
Pinkerton[245] derived an equation expressing the *limiting average concentration* attained in a rinse tank at equilibrium. It was noted that tank size does not affect the equilibrium concentration. Caldwell, Sperry, Morse & DeLong[246] submitted copper-nickel-chromium plated zinc-base, aluminum-base and magnesium-base die castings to *atmospheric exposure* at various locations for

one year. To us the most interesting conclusion drawn from their tests was the discovery of *very little correlation between salt spray and atmospheric exposure resistance.*

Bibliography

1. J. W. Hensley, H. A. Skinner & H. R. Suter. Met. Fin., **50**, 49 (July); 77 (Aug.).
2. J. W. Hensley. Iron Age, **170**, 151 (Nov. 13).
3. S. Spring. Met. Fin., **50**, 65 (Feb.).
4. E. Domingo. U. S. Pat. 2,600,221 (June 10).
5. A. S. T. M. Designation B252-51T.
6. H. K. Hunt. Met. Fin., **50**, 72 (Oct.).
7. V. Dvorkovitz & T. G. Hawley, Jr. U. S. Pat. 2,615,848 (Oct. 28).
8. W. F. Jesson. Electroplating, **5**, 77 (Mar.)
9. J. H. Secrist. U. S. Pat. 2,599,729 (June 10).
10. C. F. Pickett & H. Rosenfeld. U. S. Pat. 2,613,186 (Oct. 7).
11. J. K. Flinchbaugh. U. S. Pat. 2,619,435 (Nov. 25).
12. A. J. Turpin. U. S. Pat. 2,614,571 (Oct. 21).
13. J. B. Delaney. Iron Age, **169**, 133 (June 19).
14. W. I. Gladfelter. U. S. Pat. 2,611,219 (Sept. 23).
15. R. S. Russell. U. S. Pat. 2,621,446 (Dec. 16).
16. J. L. Everhart. Mater. & Meth., **35**, 98 (Apr.).
17. K. F. Hamacher. U. S. Pat. 2,613,482 (Oct. 14).
18. W. C. Uhri. U. S. Pat. 2,605,596 (Aug. 5), 2,606,073 (Aug. 5).
19. H. Kincaid. Mater. & Meth., **35**, 97 (Jan.).
20. A. F. Holden. U. S. Pat. 2,601,864 (July 1).
21. A. A. Chapman. U. S. Pat. 2,615,840 (Oct. 28).
22. W. E. Caugherty. U. S. Pat. 2,598,889 (June 3).
23. J. C. Kientz. U. S. Pat. 2,605,775 (Aug. 5).
24. H. K. DeLong. U. S. Pat. 2,607,739 (Aug. 19).
25. J. V. Lorea & T. F. O'Rourke. U. S. Pat. 2,612,898 (Oct. 7).
26. J. S. Jackson. J. Electrodep. Tech. Soc., **28**, 89.
27. Metal Industry (London), **81**, 167.
28. E. E. Halls. Electroplating, **5**, 143 (May).
29. J. T. Rucker. U. S. Pat. 2,617,771 (Nov. 11).
30. W. H. Hill. U. S. Pat. 2,606,155 (Aug. 5).
31. W. H. Hill & D. K. Shipley. U. S. Pat. 2,596,150 (May 13).
32. P. H. Cardwell, L. H. Eilers & B. P. Robinson. U. S. Pat. 2,606,873 (Aug. 12).
33. R. O. Bowman. U. S. Pat. 2,608,392 (Aug. 26).
34. J. W. Carroll. U. S. Pat. 2,614,081 (Oct. 14).
35. D. A. McArthur. U. S. Pat. 2,594,192 (Apr. 22).
36. A. J. W. Moore. J. Electrodep. Tech. Soc., **28**, Prep. No. 1.
37. H. K. Hunt. Met. Fin., **50**, 65 (July).
38. G. T. Colegate. Sheet Met. Ind., **29**, 941.
39. W. G. Patton. Iron Age, **170**, 155 (Dec. 11).
40. J. E. Tyler. Iron Age, **170**, 98 (July 24), 91 (July 31).
41. E. Newcomb. Canadian Metals, **15**, 30 (Apr. 1).
42. R. M. Bell. U. S. Pat. 2,612,007 (Sept. 30).
43. E. W. Hall. U. S. Pat. 2,593,672-3 (Apr. 22).
44. L. M. Seelenfreund. U. S. Pat. 2,594,812 (Apr. 29).
45. B. P. Sax. U. S. Pat. 2,599,785 (June 10).
46. J. J. Lawlor. U. S. Pat. 2,602,273 (July 8).
47. G. W. Bruner & J. C. Shaffer. U. S. Pat. 2,600,613 (June 17).
48. M. L. Monger. U. S. Pat. 2,601,048 (June 17).
49. J. F. Leslie. U. S. Pat. 2,607,171 (Aug. 19).
50. J. V. Tullo. U. S. Pat. 2,608,035 (Aug. 26).
51. H. J. McAleer. U. S. Pat. 2,616,227 (Nov. 4).
52. C. F. Schlegel. U. S. Pat. 2,616,228 (Nov. 4).
53. W. C. Burt. U. S. Pat. 2,612,005 (Sept. 30).
54. D. A. Wallace. U. S. Pat. 2,621,445 (Dec. 16).
55. C. G. Schenk. U. S. Pat. 2,620,602 (Dec. 9).
56. H. L. Gilmore. U. S. Pat. 2,620,066 (Dec. 2).
57. W. O. Vedder. U. S. Pat. 2,612,236 (Sept. 30).
58. T. P. Hoar & T. W. Farthing. Nature, **169**, 324 (Feb. 23).
59. J. Edwards. J. Electrodep. Tech. Soc., **28**, Prep. No. 2.
60. E. C. Ferryman. Metallurgia, **46**, 55 (July).
61. S. E. Eaton. U. S. Pat. 2,610,143-4 (Sept. 9).
62. J. F. Kreml. U. S. Pat. 2,607,722 (Aug. 19).
63. P. A. Charlesworth. U. S. Pat. 2,594,124 (Apr. 22).
64. J. F. Kreml. U. S. Pat. 2,616,845 (Nov. 4).
65. W. A. Marshall. J. Electrodep. Tech. Soc., **28**, 27.
66. A. Hickling, W. A. Marshall & E. R. Buckle. J. Electrodep. Tech. Soc., **28**, 47.
67. L. Beaujard. Comptes Rendus, **234**, 440 (Jan. 21).
68. F. H. Hesch. U. S. Pat. 2,593,447-9 (Apr. 22).
69. W. A. Heinrich & C. B. Fideor. U. S. Pat. Applic. 64,438 (Oct. 14).
70. F. H. Hesch. U. S. Pat 2,620,265 (Dec. 2).
71. L. T. Eby. U. S. Pat. 2,614,914 (Oct. 21).
72. W. C. Cochran. U. S. Pat. 2,613,141 (Oct. 7).
73. A. W. Wallbank. J. Electrodep. Tech. Soc., **28**, Prep. No. 7.
74. C. Sonnino. U. S. Pat. 2,584,400 (Feb. 5).
75. E. Wainer. Mater. & Meth., **35**, 176 (Apr.).
76. N. I. Kirillov & A. S. Kheynman. Met. Ind. (London), **80**, 31 (Jan. 11).
77. J. M. Alemeda. Electroplating, **5**, 286.
78. S. Tajima, Y. Kimura & T. Fukushima. Met. Fin., **50**, 67 (Oct.), 65 (Nov.).
79. S. Tajima. Prod. Fin., **17**, 41 (Dec.).
80. R. C. Spooner. Met. Ind. (London), **81**, 248 (Sept. 26).
81. R. V. VandenBerg. Iron Age, **170**, 81 (Oct. 30).
82. S. Wernick & R. Pinner. Sheet Met. Ind., **29**, 843.
83. B. C. Lewsey. Electroplating, **5**, 250.
84. A. W. Liger. U. S. Pat. 2,615,837 (Oct. 28).
85. A. Brenner, V. Zentner & C. W. Jennings. Plating, **39**, 865.
86. D. T. Ewing, A. A. Brouwer & J. K. Werner. Plating, **39**, 1033, 1343.
87. V. J. Marchese. J. Electrochem. Soc., **99**, 39 (Feb.).
88. W. A. Wesley. Ind. & Eng. Chem., **44**, 957.
89. F. K. Savage, A. K. Graham & E. P. Strothman. Mater. & Meth., **36**, 94 (Aug.).
90. B. B. Knapp & D. S. Carr. U. S. Pat. 2,594,933 (Apr. 28).
91. A. Korbelak & E. C. Okress. Plating, **39**, 1220.
92. F. Spicer. Ind. Fin. (British), **5**, 192.
93. W. G. Patton. Iron Age, **169**, 73 (June 12).
94. L. L. Shreir & J. W. Smith. J. Electrochem. Soc., **99**, 64.
95. W. H. Gauvin & C. A. Winkler. J. Electrochem. Soc., **99**, 447.
96. W. R. Binai. Plating, **39**, 1120.
97. I. K. Hauseman. Plating, **39**, 1125.
98. J. L. Everhart. Mater. & Meth., **35**, 82 (Feb.).
99. W. H. Gauvin & C. A. Winkler. J. Electrochem. Soc., **99**, 71.
100. J. F. Beaver. U. S. Pat. 2,602,774 (July 8).
101. F. F. Reisinger. U. S. Pat. 2,612,469 (Sept. 30).
102. F. Passal. U. S. Pat. 2,609,339 (Sept. 2).
103. T. A. Hood. Met. Fin., **50**, 103 (June).
104. F. Taylor. Met. Fin., **50**, 53 (July).
105. N. Hackerman & T. Jensen. J. Electrochem. Soc., **99**, 60.
106. H. E. Ricks. Plating, **39**, 1029.
107. G. C. Close. Prod. Fin., **17**, 32 (Nov.).
108. E. Mayer-Rassler. Met. Ind. (London), **87**, 127 (Aug. 15).
109. F. R. Keller, C. C. Cupps & R. E. Shaw. Plating, **39**, 152.
110. S. C. Wilsdon. U. S. Pat. 2,620,296 (Dec. 2).
111. G. Sagen. U. S. Pat. 2,600,171 (June 10).
112. L. G. DeQuasie & R. F. Eisenberg. U. S. Pat. 2,594,881 (Apr. 29).
113. C. A. Zapffe & M. E. Haslem. Plating, **39**, 468.
114. C. H. Hannon. Met. Fin., **50**, 65 (Oct.).
115. W. E. Leonard. U. S. Pat. 2,580,801 (Jan. 1).
116. P. N. Murphy. U. S. Pat. 2,601,863 (July 1).
117. F. T. Crego. U. S. Pat. 2,594,129 (Apr. 22).
118. P. T. Gilbert. J. Electrochem. Soc., **99**, 16.
119. M. B. Diggin. Prod. Fin., **16**, 40 (Apr.).
120. L. Silverman. Met. Fin., **59**, 75 (Nov.).
121. C. J. Wernlund. U. S. Pat. 2,600,352 (June 10).
122. R. A. Hoffman. U. S. Pat. 2,621,152 (Dec. 9).
123. A. E Chester. U. S. Pat. 2,614,975 (Oct. 21).
124. E. I. Isherwood. U. S. Pat. 2,602,775 (July 8).
125. H. Bablik, F. Gotzl & R. Kukaczka. Sheet Met. Ind., **29**, 173 (Feb.).
126. L. W. Bechter. U. S. Pat. 2,580,394 (Jan. 1).

127. C. W. Morrison. U. S. Pat. 2,622,020 (Dec. 16).
128. D. N. Layton. J. Electrodep. Tech. Soc., **28**, Prep. No. 9.
129. H. E. Arblaster. Australasian Eng., 73-5 (Apr. 7).
130. S. E. Eaton, R. W. Fabian & E. H. Newton, Met. Fin., **50**, 63 (Dec.).
131. H. Wolfson & B. Thomson. U. S. Pat. 2,613,179 (Oct. 7).
132. J. B. Mohler. Met. Fin., **50**, 72 (Apr.).
133. D. J. Evans & M. R. Hopkins. J. Electrodep. Tech. Soc., **28**, Prep. No. 3.
134. K. L. Koessler & R. R. Sloan. Electrotypers & Stereotypers Bull., **38**, 7 (July).
135. E. H. Konrad & W. H. Kaye. U. S. Pat. 2,580,681 (Jan. 1).
136. E. H. Konrad & W. E. Eustis. U. S. Pat. 2,587,630 (Mar. 4).
137. C. L. Bauer. Plating, **39**, 1335.
138. E. D. Eastman. U. S. Pat. Applic. 791,465 (Apr. 29).
139. A. E. Chester. U. S. Pat. 2,606,147 (Aug. 5).
140. R. Levi. U. S. Pat. 2,616,840 (Nov. 4).
141. D. E. Couch & A. Brenner. J. Electrochem. Soc., **99**, 234.
142. N. F. Murphy. Met. Fin., **50**, 76 (Apr.).
143. T. A. Hood. Plating Notes (Aug.), **4**, 126.
144. E. M. Smith. Mater. & Meth., **36**, 105 (Dec.).
145. W. G. Patton. Iron Age, **169**, 115 (June 12).
146. J. B. Russell. Steel, **131**, 100 (July 14).
147. W. B. Knight. Met. Fin., **50**, 67 (May).
148. R. F. McElwee & M. L. Holt. J. Electrochem. Soc., **99**, 48.
149. W. E. Clark & M. H. Lietzke. J. Electrochem. Soc., **99**, 245.
150. L. E. Netherton & M. L. Holt. J. Electrochem. Soc., **99**, 44.
151. J. W. Cuthbertson & N. Parkinson. J. Electrodep. Tech. Soc., **29**, Prep. No. 6.
152. R. D. Gray, Jr. & W. A. Paecht. U. S. Pat. 2,609,338 (Sept. 2).
153. M. L. Holt & H. J. Seim. U. S. Pat. 2,599,178 (June 3).
154. R. E. Shockley. U. S. Pat. 2,600,699 (June 17).
155. F. E. Newman. U. S. Pat. 2,594,061 (Apr. 22).
156. N. Ransohoff. U. S. Pat. 2,618,283 (Nov. 18).
157. T. H. Curtis. U. S. Pat. 2,605,882 (Aug. 5).
158. A. B. Wilson. U. S. Pat. 2,610,145 (Sept. 9).
159. W. W. Kompart. U. S. Pat. 2,610,146 (Sept. 9).
160. J. D. Keller. U. S. Pat. 2,581,026 (Jan. 1).
161. E. W. Rieger. U. S. Pat. Reissue 23,456 (Jan. 22).
162. A. P. Schulze & F. L. Bonem. Prod. Fin., **16**, 22 (Apr.), 34 (May).
163. C. C. Cohn. U. S. Pat. 2,596,888 (May 13).
164. J. B. Kushner. U. S. Pat. 2,592,810 (Apr. 15).
165. A. I. Caplow & H. W. Sussman. Met. Fin., **50**, 107 (June).
166. C. E. Brigham. Electrotypers & Stereotypers Mag., **38**, 41 (Nov.).
167. R. W. Mackey & D. A. Swalheim. U. S. Pat. Applic. 105,447 (Oct. 14).
168. W. H. Safranek, W. C. Schickner & C. L. Faust. J. Electrochem. Soc., **99**, 53.
169. C. L. Faust & W. H. Safranek. Tool Eng., **28**, 37 (Apr.).
170. H. D. Rice. Precis. Met. Molding, **10**, 43 (Dec.).
171. W. J. Krumbeck. Plating, **39**, 1122.
172. A. W. Grant. U. S. Pat. 2,613,178 (Oct. 7).
173. W. B. Stoddard, Jr. U. S. Pat. 2,592,614 (Apr. 15).
174. P. B. Upton, G. W. Soundy & G. E. Busby. J. Electrodep. Tech. Soc., **28**, 103.
175. M. S. Kantrowitz, E. J. Gosnell & B. General. U. S. Pat. 2,602,757 (July 8).
176. R. A. Gaiser. U. S. Pat. 2,602,032 (July 1).
177. G. B. Watkins & R. A. Gaiser. U. S. Pat. 2,596,515 (May 13).
178. R. W. Brown. Canad. Chem. Proc., **36**, 38.
179. G. W. Carr. Met. Fin., **50**, 60 (Nov.).
180. R. W. Brown. Precis. Met. Molding, **10**, 70 (Oct.).
181. S. Tolansky. J. Electrodep. Tech. Soc., **28**, Prep. No. 3.
182. C. E. Ells & G. D. Scott. J. Applied Phys., **23**, 31.
183. E. Weber & S. A. Johnson. U. S. Pat. 2,610,606 (Sept. 16).
184. P. Godley, II. U. S. Pat. 2,622,041 (Dec. 16).
185. C. F. Powell & I. E. Campbell. Met. Fin., **50**, 64 (Apr.).
186. H. A. Toulmin Jr. U. S. Pat. 2,580,976 (Jan. 1).
187. O. F. Davis & H. G. Belitz. U. S. Pat. 2,619,433 (Nov. 25).
188. M. S. Roush. U. S. Pat. 2,622,043 (Dec. 16).
189. J. J. Lander. U. S. Pat. 2,602,033 (July 1).
190. S. L. Eisler & P. G. Chamberlain. Met. Fin., **50**, 113 (June).
191. S. L. Eisler & J. Doss. Met. Fin., **50**, 54 (Dec.).
192. R. Preston, R. H. Settle & J. B. Worthington. J. Iron & Steel Inst., **170**, 19.
193. R. C. Gibson. U. S. Pat. 2,609,308 (Sept. 2).
194. G. S. Mustin. Met. Fin., **50**, 53 (Feb.).
195. A. J. Beck. Met. Ind. (London), **81**, 69 (July 25).
196. F. X. Thomson. U. S. Pat. 2,610,133 (Sept. 9).
197. H. M. Freud. U. S. Pat. 2,605,217 (July 29).
198. N. Goldowski. U. S. Pat. Applic. 619,264 (Apr. 29).
199. R. A. Neish. U. S. Pat. 2,606,866 (Aug. 12).
200. R. H. Prew. U. S. Pat. 2,621,104 (Dec. 9).
201. D. I. Walker & E. A. Dieman. U. S. Pat. 2,598,949 (June 3).
202. M. P. Kleinholz. U. S. Pat. 2,610,919 (Sept. 16).
203. B. I. Costello. U. S. Pat. 2,611,711 (Sept. 23).
204. C. F. McCue & W. E. Brown. U. S. Pat. 2,595,158 (Apr. 29).
205. G. D. Galwin & A. E. McAuley. U. S. Pat. 2,615,815 (Oct. 28).
206. J. M. Michel & K. F. Hager. U. S. Pat. 2,602,760 (July 8).
207. A. L. Alexander. Elec. Mfg., **49**, 112 (Feb.).
208. P. Ffield. Corrosion, **8**, 29 (Jan.), Feb.).
209. H. A. Van Oosterhout & E. J. van de Velde. Met. Fin., **50**, 60 (Apr.).
210. S. L. Eisler. Plating, **39**, 1019.
211. K. E. Langford. Electroplating, **5**, 41 (Feb.).
212. I. Goldman. Met. Fin., **50**, 76 (Nov.).
213. J. M. Kruse & M. G. Mellon. Sewage & Ind. Wastes, **24**, 1254.
214. H. C. Marks & N. S. Chamberlin. Anal. Chem., **24**, 1885.
215. G. H. Rendel. U. S. Pat. 2,603,595 (July 15).
216. H. C. Schlaupitz & W. D. Robertson. Plating, **39**, 750, 862.
217. F. L. LaQue. Mater. & Meth., **35**, 77 (Feb.).
218. J. B. Mohler. Plating, **39**, 475.
219. J. B. Kushner. Prod. Fin., **16**, 32 (Sept.).
220. A. K. Graham & H. L. Pinkerton. Sewage & Ind. Wastes, **24**, 207.
221. H. R. Murdock. Ind. & Eng. Chem., **44**, 105A.
222. I. D. Cox. Sewage & Ind. Wastes, **24**, 1312.
223. B. F. Dodge & W. Zabban. Plating, **39**, 1133, 1233.
224. C. F. Paulson. Plating, **39**, 1330.
225. C. F. Paulson. Met. Fin., **50**, 48 (May).
226. T. J. Fadgen. Sewage & Ind. Wastes, **24**, 1101.
227. F. X. McGarvey, R. E. Tenhoov & R. P. Nevers. Ind. & Eng. Chem., **44**, 534.
228. F. J. Clauss & L. E. Brownell. Iron & Steel Eng., **29**, 63 (Mar.).
229. W. Tiddy & F. D. Cooper. U. S. Pat. 2,605,169 (July 29).
230. E. W. Mulcahy. Ind. Chemist & Chem. Mfr., **28**, 125 (Mar.).
231. F. J. Bartholomew. Ind. & Eng. Chem., **44**, 541.
232. N. Swindin. U. S. Pat. 2,616,790 (Nov. 4).
233. G. J. Horvitz. U. S. Pat. 2,618,592 (Nov. 18).
234. G. W. Heise, E. A. Schumacher & H. R. Wilson. U. S. Pat. 2,583,098 (Jan. 22).
235. J. P. Oliver. U. S. Pat. 2,583,099 (Jan. 22).
236. J. P. Oliver. U. S. Pat. 2,583,101 (Jan. 22).
237. H. R. Wilson. U. S. Pat. 2,583,100 (Jan. 22).
238. J. E. Stareck. U. S. Pat. 2,616,841 (Nov. 4).
239. C. M. Rice. U. S. Pat. 2,614,912 (Oct. 21).
240. J. F. Kreml. U. S. Pat. 2,618,578 (Nov. 18).
241. E. F. Fischer. U. S. Pat. 2,613,165 (Oct. 7).
242. R. S. Stuffer. U. S. Pat. 2,596,307 (May 13).
243. F. W. Wagner U. S. Pat. 2,619,457 (Nov. 25).
244. H. M. Murray. Met. Fin., **50**, 62 (May).
245. H. L. Pinkerton. Plating, **39**, 1016.
246. M. R. Caldwell, L. B. Sperry, L. M. Morse & H. K. De Long. Plating, **39**, 142.



Relation of Surface Improvement by Electropolishing to Mechanical Properties

J. Heyes; *Metalloberflaeche*, vol. 5, No. 12, pp. B 177 - B 179.

The surface mechanical properties investigated were wear, rubbing resistance, surface lubrication characteristics and surface frictional properties, as affected by electropolishing. Preliminary tests served to show that both the surface frictional resistance as well as the wear resistance were considerably improved by the electropolishing treatment. An interesting fact found was that the frictional resistance in the case of the mechanically surface polished test pieces was higher in the beginning than at the end of a 3 minute test period while, with the electropolished test pieces, only a slight increase in the frictional resistance was found. The wear is considerably smaller with the electropolished specimens, corresponding to the lower frictional resistance. It can be assumed that this is caused by the surface micro-roughness, which is present with the mechanically polished specimens and which is removed during the running; this surface micro-roughness is removed prior to the running test, by the electropolishing procedure. Consequently the frictional resistance with the electropolished surface changes vary only slightly during the test period.

Interesting results were obtained from a practical test made with pairs of gear wheels in which one wheel was plastic, the other being metallic. As the wheel opposite to the plastic wheel, there were used steel wheels (of which some had been electropolished) and cast iron, two types of light alloy (some of which had been hard chromium plated), bronze and brass (some of the wheels of both these metals had been hard chromium plated). The tests showed that the wear in the case of the steel wheels which had been electropolished was particularly low. A further interesting fact is that the electropolished gear wheels even showed themselves to be superior in use to the hard chromium plated wheels.

These facts were explained as follows. It was first assumed that the plastic first polishes away all the micro-roughness of the wheels, and the "polish dust" becomes fixed in the plastic material. If this micro-roughness of the gear wheel is previously removed by electropolishing, then the plastic gear wheel cannot absorb the wear dust and consequently exerts no wear effect on the opposite wheel.

Tests were then conducted on electropolished crankshafts, treated in a 200 liter acetic-perchloric acid bath. The polishing of the journal surfaces of the crankshafts has special technical interest because, to smooth off the surface after the finish grind, a hand polishing is normally necessary. Obviously this work is very tedious and time absorbing. Also it is not possible to smooth down the side surfaces at the crank journals.

The crankshafts were covered, up to the running surfaces, with polyvinyl chloride solution and suspended in a rack constructed of wire about 3 mm. thick. This enclosed the running surfaces in the form of a semicircle. The crankshaft formed the anode and the suspension rack the cathode. The current density was 87 amp. and the electropolishing time 15 minutes. After electropolishing, the crankshaft journals had a 0.020 to 0.025 mm. smaller diameter. No change in the geometrical form of the journal occured from the polishing. With a second crankshaft of the same origin, the current density was reduced to 40 amp. and the polishing time reduced to 10 minutes. In this case the thickness reduction amounted to 0.015 mm.

Surface examination showed that the roughness peaks of the metal had been reduced from 2 microns to 0.7 microns by the electropolishing but this is not the complete picture. Apart from the average peak values of the roughness, the number and the shape of the roughness peaks play an important part in all wear phenomena. The results which were obtained by electropolishing of the crankshafts show that this surface treatment can also be applied to quite large components. The good throwing power of the acetic-perchloric acid electrolyte gives a uniform polishing effect without special measures, and with dimensional control.

Brass Plating

O. Kraemer; *Metalloberflaeche*, vol. 5, No. 12, pp. B 181 - B 183.

For brass plating, the separation potentials of the copper and the zinc must be the same or close to each other; the content of free potassium cyanide is of particular importance to ensure the necessary change in

the separation potential. Normally copper has a more noble separation potential than zinc; by the addition of potassium cyanide to the electrolyte the copper potential becomes less noble while the zinc potential does not change at all practically, so the two potentials come closer together and simultaneous deposition of the two metals becomes possible. The color of the brass depends broadly on the composition but the cause of a reddish-yellow color is not always due to a higher copper content. Thus 80-20 is yellow-red, 75-25 bright yellow, 73-27 yellow and 67-33 yellow red again.

One of the difficulties in the preparation of brass coatings accordingly is the maintenance of a uniform color of the plate. As mentioned above, the free cyanide content has a great influence on the color. Other factors also intervene however, in the simultaneous deposition of copper and zinc — current density, bath temperature, pH and, in the case of profiled objects, the anode to cathode distance. Various additions also affect the color such as ammonia, aluminum chloride and brighteners. Recommended bath compositions are as follows: *Still Bath:* copper acetate 1.25 kg.; zinc chloride 1.25 kg.; sodium carbonate 3 kg.; sodium bisulfite 2 kg.; potassium cyanide 3.5 kg.; water 100 liters; arsenic as brightening addition 20 g. Concentration: 8-9° Bé. Current density: 0.35 amp./sq. dm. *Barrel Plating:* Potassium copper cyanide 4.0 kg.; potassium zinc cyanide 4.0 kg.; sodium carbonate 1.5 kg.; sodium sulfate 1.5 kg.; sodium sulfite 2.0 kg.; potassium cyanide 1.0 kg.; water 100 liters. Concentration 10° Bé. Current density 0.45 amp./sq. dm.

The most favorable temperature range is between 20 and 30°C. For rapid plating baths where higher current densities are used, 40°C. is normal. Higher temperatures than 40° brings serious disadvantages, as cyanide decomposition becomes appreciable. As with other baths, higher current densities can be used with increased temperature but the color of the brass plate then changes without any change in the bath composition. With higher temperatures the brass deposit becomes reddish while other conditions remaining equal, the deposit will be yellow at lower temperatures. Within limits the current density also affects the color of the deposit. At lower current densities the deposit is reddish, with high densities it becomes more yellow. This is the reason that recessed parts often do not assume a uniform brass color; the edges and projections will often be bright yellow while the recessed parts will be reddish-yellow. A certain remedy is to increase the spacing distance cathode to anode; this will require a higher voltage. In normal practice the bath voltage increase is around 0.25 volts for each 5 cm. increase in anode-cathode spacing. The pH should be between 9.5 and 10. If the pH value rises to 12.5 then the deposit, even with correct bath composition, temperatures and current density, becomes tombac color. Color control of the brass is claimed by addition of alkali hydroxides to the bath (German Patent 685,630). Addition of 0.5 to 1.5 parts of alkali hydroxide to 1 part of zinc cyanide gives uniform brass color over a wide range.

Palladium Plating

Anon. *Galvano* (Paris), vol. 21, No. 183, p. 22.

Palladium is softer than gold or silver and, for a noble metal plate, it is preferable to these two metals since it gives better protection with a thinner coating; in addition it does not blacken by the effect of sulfurous gases in the atmosphere as does silver. It is unoxidizable at ordinary temperature like platinum, it is as hard as platinum and is less than half the density. The fact which renders it above all superior to platinum is that it can be deposited easily on iron or steel at room temperature and without a subcoating of copper. This permits plating delicate objects such as springs, for example, and giving an unoxidizable coating without affecting the elasticity of the base metal.

As regards the composition of the plating baths, the comparison of palladium with platinum leads obviously to the conception that the formulas which serve for platinum plating will suffice also for palladium deposition. This is in fact the case.

A bath for producing palladium coatings by immersion has the following composition:

Palladium chloride	10 g.
Caustic potash	200 g.
Water	1 liter

The immersion is conducted at the boiling point and, as with platinum, the deposit is more gray than with an electroplated coating. This bath is less stable than the corresponding platinum bath because, under the action of prolonged boiling, the metal tends to precipitate.

For palladium plating the following formula is recommended, based on the formulation of the corresponding thick platinum plating bath:

Palladium chloride	5 g.
Ammonium phosphate	25 g.
Sodium phosphate	100 g.
Water	1 liter

This bath is prepared exactly as the corresponding platinum bath. It is operated warm with a platinum anode. Current density is about 1 amp. This bath will work cold, however, if necessary.

The following two bath formulas are given by Salauze:

1. Diaminonitrite of palladium — 8 g./L.
   Ammonium nitrate — 100 "
   Sodium nitrate — 10 "
   Ammonia — 50 "

   This bath works at pH 7.

2. Double chloride of sodium and palladium — 10 g./L.
   Sodium nitrite — 10 "
   Sodium chloride — 50 "

   This bath works at 50°C. with a current density of 1 amp. Its pH is maintained between 4 and 5.

The following formula is given by Pfanhauser:

Palladium chloride	5 g./L.
Ammonium phosphate	50 "
Sodium phosphate	250 "
Benzoic acid	2.5 to 3 "

Palladium is used for anodes. The bath is operated at the boiling point.

Shop Problems

METAL FINISHING publishes, each month, a portion of the inquiries answered as a service to subscribers. If any reader disagrees with the answers or knows of better or more information on the problem discussed, the information will be gratefully received and the sender's name will be kept confidential, if desired.

Electroplating of Metals

Question: Is there any information that you can send us with reference to the electroplating of metals?

S. H.

Answer: We suggest that you obtain a copy of our latest Metal Finishing Guidebook-Directory. You will note from the material in this book that the field of electroplating is quite extensive so that asking for information on electroplating of metals is quite a request.

Container for Bright Dips

Question: What can we use as a container or tank liner which will stand a concentrated bright dip .

S. M.

Answre: Bright dips are generally held in ceramic tanks and crocks. However, type 347 stainless steel will be suitable if excess hydrochloric acid or sodium chloride is avoided. Other types of stainless steel will be suitable, if they are stress relieved to eliminate corrosion at the welds.

Koroseal may also be suitable for your application.

Jenolite Process

Question: In your June, 1952 issue of METAL FINISHING there was an article entitled "British Phosphate Process Now Available in U. S.," on page 145. It would be greatly appreciated if you would forward the complete mailing address of the Eastern Jenolite Distributing Co.

A. K.

Answer: We have been unable to find the complete address of the Eastern Jenolite Distributing Co. However, we would suggest that you contact the manufacturer, Jenolite, Ltd., 43 Piazza Chambers, Covent Garden, W.C. 2, London, England.

Immersion Brass on Steel

Question: Recently we have heard of a brass plating by immersion process now being used commercially.

We would appreciate any information you may have on this process and if possible a finished sample.

If adaptable we would use this to finish articles made of cold rolled steel.

H. W. L.

Answer: A thin brassy colored deposit can be produced on iron and steel similar to a copper wash, such as is used on wire. The following formula is suggested:

Copper sulfate	8 oz.
Mossy tin	8 oz.
Sulfuric acid	½ pint
Water	1 gal.

Van der Horst Process

Question: Is there a Van der Horst method of high speed chrome plating? During a discussion at our shop the other day someone mentioned this method of hard chrome plating at high speeds. However, he could give no informaton other than the name. Is there such a method, and if so, what is the technique used?

W. J. M.

Answer: The Van der Horst chromium plating process involves the production of porous chromium deposits for parts such as cylinder liners for internal combustion engines. The company is located in Olean, N. Y.

The technique is similar to that described in the latest edition of the Metal Finishing Guidebook in the section on Porous Chromium.

Brown Lead Anodes in Chromium Tank

Question: I am confronted with a problem of a dark brown deposit on the lead anodes in my chrome tank. Not being too well versed in this field, can you give me some information as to the cause and remedy of this problem?

J. G.

Answer: We would suggest that you relax and enjoy it. The dark brown color is due to a film of lead peroxide, which is necessary for oxidizing trivalent chromium back to chromic acid and indicates that your anode condition and operation are satisfactory.

Poor anode operation is indicated by an orange scale of lead chromate.

Dyed Phosphate Coatings

Question: Please send me a list of firm names that supply dyed phosphate coating processes. Can you tell me what the Parco-lube process consists of in general?

J. P. L.

Answer: We would suggest that you communicate with manufacturers of materials listed on page 545 of the 1951 Metal Finishing Guidebook under "Rust Preventatives." They will advise as to suitable dyes for their phosphate processes.

Parco-lubrizing is a process of phosphating in such a manner that the surface becomes oil retentive, offering an excellent lubricating film for moving parts.

Lead-Indium for Bearings

Question: We have a request from one of our customers for the plating of lead indium on aircraft bearings. As we cannot find any local specifications on this process we are asking your assistance on the correct procedure for processing these parts.

F. B.

Answer: Aeronautical Material Specification AMS 2415b of the Society of Automotive Engineers calls for the indium to be 5.5—8.0% of the weight of the deposited lead. The usual lead thickness is 0.0005" to 0.001".

After lead plating and rinsing, a cyanide dip is used, if the indium is deposited from the indium cyanide bath,

to neutralize traces of acid lead solution.

After indium plating, generally about 0.0001" thick, the bearing is immersed in an oil bath at 340-350 deg. F. for 2 hours to diffuse the indium into the lead.

Bright Silver Finish on Small Parts

Question: I have to silver plate iron flowers and I cannot obtain a bright finish. I use the following process:

1. Pickle in muriatic acid pure
2. Water rinse
3. Copper plate
4. Water rinse
5. Silver strike
6. Silver plate
7. Scratch brush

These pieces are not easy to polish because they are small and very difficult to handle.

J. H.

Answer: To obtain a bright finish on small articles you should ball burnish the steel, bright dip and ball burnish again after copper plating and then burnish the silver plate.

If the parts will not stand up under ball burnishing, you should apply a heavy deposit from a bright copper solution and then bright dip in one of the proprietary bright dipping solutions, which will give you a brighter finish than a bright dip from the regular nitric-sulfuric dip.

On page 531 of the 1951 edition of the Metal Finishing Guidebook you will find a list of suppliers of bright dips for brass, which will also be suitable for copper.

Metallizing Perfume Bottles

Question: It is required to coat the outside of perfume bottles with silver or aluminum. On the metal coating is to be laid a lacquer which will not dissolve in water, alcohol and the common organic solvents. What silvering processes are commonly used in such an application and what lacquers are available which would meet the specifications?

G. G.

Answer: The usual method of coating such items is to apply a coating of bright aluminum by vacuum metallizing, followed by a suitable lacquer.

If the metal applied to the outside of the perfume bottle is to be in the form of a design and silver plated, common practice is to apply the design in a conducting silver paint, usually by silk screening, and then silver plate.

Alcohol resistant lacquers are obtainable from most lacquer manufacturers.

Pickling Silver and Gold

Question: Recently I've started to work with silver metal, with which I am not very familiar. After the pieces are either soldered or annealed, there is what we call fire in the metal. I was told that there is a fire dip which will take the fire out of silver, which is then followed by a peroxide dip, which is supposed to eliminate scratch brushing. Is this true? Can you supply me with the formulas, also a fire dip for gold filled work?

F. D. M.

Answer: A commonly used fire dip for silver consists of 2 gallons of nitric acid plus 1 gallon of water. The solution can be used hot or at room temperature.

There is no fire dip for soldered gold. Such articles are pickled in a hot solution of 1½ pints of sulfuric acid per gallon of water.

The following solution has been employed for brightening silver by the peroxide method:

Prepare a solution of 1 lb. sodium cyanide per gallon of water. For use, add 4 fluid oz. of 30% (100 volume) hydrogen peroxide to 1 pint of the cyanide solution and immerse the work. The solution decomposes rapidly so it must be prepared fresh for each batch of work.

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Recently Granted Patents
in the Metal Finishing Field

Patents

Cleaning Composition

U. S. Patent 2,613,186. *Oct. 7, 1952.*
C. F. Pickett and M. Rosenfeld

A cleaning composition consisting essentially of from about 33% to about 90% of high flash naphtha, from about 7% to about 55% of kerosene, and from about 1% to about 15% of a tertiary aliphatic alcohol selected from the group consisting of diacetone alcohol and tertiary butyl alcohol.

Corrosion Preventive Oil

U. S. Patent 2,611,711. *Sept. 23, 1952.*
B. L. Costello

An oleaginous composition characterized by the ability to prevent corrosion of metallic surfaces when applied thereto and to be easily removed therefrom, consisting of a homogeneous blend of about 47% by weight of soybean oil, about 33% by weight of sperm oil and about 20% by weight of linseed oil.

Article for Polishing

U. S. Patent 2,611,689. *Sept. 23, 1952.*
P. W. Porter, assignor to D. & H. Scovil, Inc.

A polishing implement comprising a body having a flexible surface, a polishing layer adhering to said surface, said layer including abrasive particles dispersed in an adhesive matrix comprising by weight about 2.24 to 20% of polyvinyl acetate, 65 to 40% alkali-silicate, .5 to 6% sodium carboxymethylcellulose, 26 to 16% clay, and 4.5 to 2.0% sorbitol.

Brush and Brush Material

U. S. Patent 2,609,641. *Sept. 9, 1952.*
R. O. Peterson, assignor to The Osborn Mfg. Co.

As a new article of manufacture, brushing material of the character described comprising a flexible strand formed of twisted fabric sheet material having abrasive particles adhered thereto, said fabric sheet material being twisted to bring such adhered abrasive particles substantially entirely internally of said strand, and projecting into the interstitial openings thereof.

Pickling Bath Foaming Agent

U. S. Patent 2,614,081. *Oct. 14, 1952.*
J. W. Carroll, assignors to The Pennsylvania Salt Mfg. Co.

A composition for controlling the action of an acid bath for pickling metals comprising a foam-forming component containing as its essential ingredients a lignin sulfonate selected from the group consisting of alkali metal and alkaline earth metal lignin sulfonates and a finely divided clay, the lignin sulfonate being present in an amount at least two-thirds that of the clay, by weight.

Pickling Solution

U. S. Patent 2,612,898. *Oct. 7, 1952.*
J. V. Lorea and T. F. O'Rourke

The method of chemically cleaning metal jewelry parts made of gold-filled, karat gold, silver, brass, brass alloys and the like to remove oxidation, comprising the steps of immersing the jewelry parts in a solution containing when prepared five to ten ounces by weight of alkali metal cyanide and hydrogen peroxide equivalent to 600 to 800 cc. of 33% solution per 3½ gallons of water, and agitating the jewelry parts while immersed, the time of immersion and agitation being not more than fifteen minutes.

Wet Blasting Apparatus

U. S. Patent 2,613,482. *Oct. 14, 1952.*
K. F. Hamacher

In a wet blasting apparatus: a hopper adapted to contain a liquid suspension and having a bottom portion into which the suspended material in said suspension tends to settle, said hopper being formed with a side opening above said bottom portion and below the normal liquid level in said hopper: a housing fixed to the side of said hopper and communicating with the interior thereof through said hopper opening; and a pump positioned in said housing.

Work Blasting Equipment

U. S. Patent 2,611,219. *Sept. 23, 1952.*
W. I. Gladfelter, assignor to Pangborn Corp.

In a blast room, a walled enclosure, a trackway extending across the upper part of the enclosure, an elevator car suspended from said trackway, means for traversing said suspended car along said trackway, means for raising and lowering said car relative to said trackway, and blasting means carried by said car and mounted for at least limited universal movement relative thereto.

Bright Silver

U. S. Patent 2,613,179. *Oct. 7, 1952.*
H. Wolfson and B. Thomson, assignors to International Standard Electric Corp.

An argentocyanide electrolyte for use in electrodepositing bright silver plate at high current densities of at least 10 amp./ft.^{2} of cathode area that consists essentially of an aqueous solution of the following substances in substantially the proportions indicated:

	G./l.
Silver cyanide	40
Potassium cyanide	55
Potassium nitrate	100
Potassium selenite	1.0

Rust Inhibiting Composition

U. S. Patent 2,610,919. *Sept. 16, 1952.*
M. P. Kleinholz, assignor to Sinclair Refining Co.

A composition adapted to inhibit the rusting of iron and steel consisting essentially of a mineral oil as its base and about 1-2% calcium mahogany sulfonate and about 0.4-1% of a material of the group consisting of alpha-hydroxy lauric acid and the product resulting upon partial self-esterification of such acid and which contains in admixture the acid, the semi-lactide esterification product of the acid, and a relatively minor proportion of the lactide esterification product of the acid.

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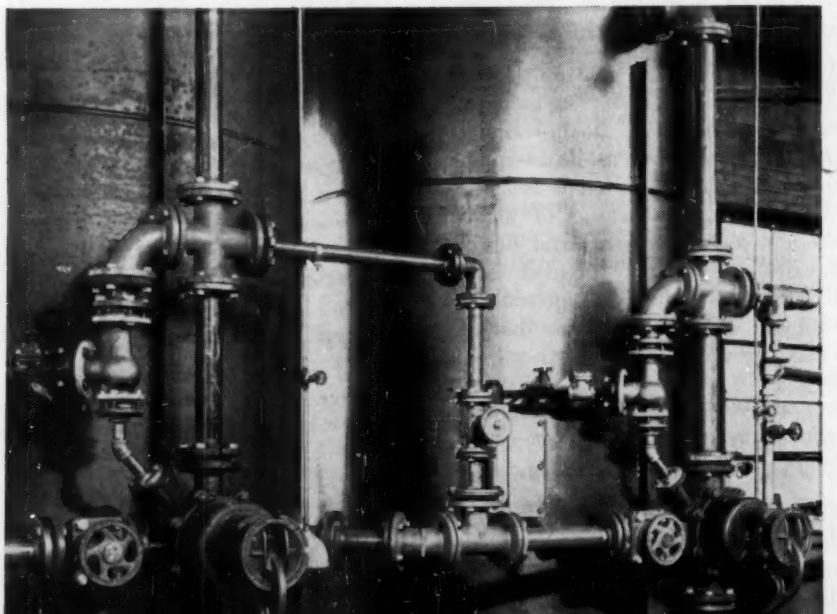

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Aluminum Bright Dip

U. S. Patent 2,613,141. *Oct. 7, 1952. W. C. Cochran, assignor to Aluminum Co. of America*

A method for chemical brightening of aluminum which comprises immersing an aluminum article in a solution consisting essentially of about 60 to 80 per cent phosphoric acid, about 1 to 10 per cent hydrogen peroxide and about 15 to 35 per cent water, referred to the total weight of the aforesaid components, the solution being maintained at a temperature above about 70°C.

Bright Dip for Aluminum

Patent Application 64,438. *Oct. 14, 1952. W. A. Heinrich and C. B. Fideor*

A method of bright polishing aluminum which consists in immersing the aluminum into a solution containing 4-8% HNO_3, 60-75% H_3PO_4, 24-36% water and .005% of a wetting agent comprising an alkyl aromatic sulphonate of the benzene series containing a 7-35 carbon atoms in an open-chain aliphatic hydrocarbon radical while the solution is maintained at a temperature within the range of 200°F. to 240°F. Comparable results are obtained when chemically equivalent amounts of nitrate salts are substituted for the nitric acid. No electric current is employed in this polishing method.

Method of Electroforming Seamless Tubes

U. S. Patent 2,613,178. *Oct. 7, 1952. A. W. Grant, assignor to U. S. Rubber Co.*

The method of making upon the same form successive tubular objects of iron having a smooth accurately sized inner surface, which comprises providing a steel form having a smooth accurately formed outer surface, electrodepositing a thin barrier in the form of a flash film of copper over the form, electrodepositing a film of lead approximately .001 inch thick over the copper, electrodepositing a seamless iron jacket of substantial thickness over said second flash film so that the bore of this jacket will conform within approximately .001 of an inch to the size of the corresponding portion of said form, and then melting the lead film and drawing the iron jacket off the form while the lead is prevented by the barriers from contacting the metal of the form or jacket.

Method of Enameling Metalware

U. S. Patent 2,612,457. *Sept. 30, 1952. Henry M. Davis, assignor to U. S. Steel Co.*

In a method of enameling sheet-steel the steps including applying to one side of the metal a slip composed largely of boro-silicate frit with a small amount of clay, applying to the other side a similar slip containing in addition from 25 to 50% by weight of frit of a metal oxide which increases the fusion temperature of the slip, drying the applied slips, and firing the coated metal at a temperature between the fusion point of the first-mentioned slip and that of the second-mentioned slip, thereby vitrifying the slip applied to said one side yet leaving the slip applied to the other side incompletely fused and permeable by gases occluded in the metal.

Method of Electropolishing

U. S. Patent 2,610,144. *Sept. 9, 1952. S. E. Eaton, assignor to Oneida, Ltd.*

Method for the anodic polishing of silver, copper, cadmium, alloys consisting of these metals, brass, zinc and nickel silver in an electrolytic cell containing a cyanide bath in which the rate of agitation of the anode with respect to the electrolyte affects the potential difference-current density curve and the location of the equilibrium etching, polishing and permanent coloration regions with respect to said curve, said method comprising the steps of setting up an initial agitation of such metal with respect to the electrolyte, applying a potential difference between the anode and the cathode, said potential difference being in the equilibrium polishing region, cyclically changing said rate of agitation to shift the resulting potential difference-current density values to a point outside said polishing region for a period of time short enough to avoid the formation of a permanent etch or a permanent coloration, and repeating said cycle until at least a portion of the anode acquires a polish.

Method of Electropolishing

U. S. Patent 2,610,143. *Sept. 9, 1952. S. E. Eaton, assignor to Oneida, Ltd.*

Method for the anodic polishing of silver, copper, cadmium, alloys consisting of these metals, brass, bronze, zinc and nickel silver, in an electrolytic cell containing a cyanide bath, which

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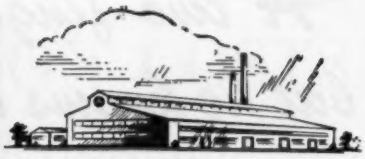

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comprises the steps of applying a continuously unidirectional substantially constant initial electric current and potential difference between such metal, as the anode surface, and the cathode of the cell, positively fluctuating such potential difference, the upper limit of which fluctuation is below that potential difference at which permanent discoloration of the anode surface would take place within the time period of the fluctuation during which it is maintained and the lower limit of which fluctuation is above that potential difference at which etching of the anode surface would take place within the time period of the fluctuation during which it is maintained, the complete time cycle of each variation being approximately 1 to 30 seconds and continuing such positive fluctuation of the unidirectional potential difference between the surface which is to be polished and the cathode of the cell until at least a portion of the anode surface of the metal acquires a polish.

Method of Producing Vitreous Enamelled Metal Articles

U. S. Patent 2,609,594. *Sept. 9, 1952. R. A. Whitbeck, assignor to Gilron Products Co.*

The method of producing vitreous enamelled metal articles comprising coating heavy tooth porous metal stock to a thickness sufficient to coat the peaks of the teeth of the stock and substantially fill the valleys between the teeth with a water-soluble, homogeneous, self-adherent and tenacious dry lubricating and protective reinforcing coating having sufficient body resistance to compression to reinforce and prevent substantial deformation of the teeth of the stock during cold pressure forming thereof between two metallic dies in the absence of any additional lubricants, washing off in an aqueous bath at least a major portion of the coating material remaining after the shaping operation, drying the shaped stock, whereby the teeth and porosity of the stock are preserved, and subsequently, in the absence of any pickling operation sufficient to cause substantial change in the shape of the teeth of the stock, vitreous enamelling the shaped stock directly on the formed surface while its tooth and porosity are substantially in the condition in which they existed at the completion of the washing step.

Glazing and Polishing Machine

U. S. Patent 2,612,005. *Sept. 30, 1952. W. C. Burt, assignor to Clair Mfg. Co.*

In a polishing and glazing machine, in combination, a pair of rolls, a slide member movable towards and away from the rolls in a line at right angles to the longitudinal axes of the rolls, a platform carried by said slide member and movable thereon in directions parallel to said rolls, a work holder carried by said platform by means of pivotal connections therewith having pivot axes parallel to said rolls, means for causing said slide member and said platform to independently oscillate, and drive means to cause the work holder to pivot relative to said platform, said work holder being constructed and arranged so as to support a plurality of work pieces to extend forwardly therefrom for passage between said rolls for polishing or glazing purposes, power supply means coupled to said slide member and to said platform and to said work holder for oscillation thereof, and said drive means being controlled by a variably controllable power throttling device in turn controlled by movement of said work holder to vary the speed of pivoting of said holder at different phases of its movements about said pivotal connections thereof.

Dust Collector

U. S. Patent 2,612,236. *Sept. 30, 1952. W. O. Vedder, assignor to Pangborn Corp.*

A bag type dust collector comprising a housing, a grid plate dividing the housing into a lower, dust receiving

chamber and an upper bag and clean air receiving chamber, a walkway extending longitudinally of the grid plate, said grid plate being formed with transversely elongated openings at each side of said walkway, shaker frames positioned in said housing above and in spaced relation to said openings, filter bags suspended from said shaker frames, said bags having transversely elongated mouths provided with resilient marginal sealing means, transversely elongated nozzle members through which the mouths of said bags are extended, transversely elongated retainer sleeves receivable within said bag mouths and nozzles for positioning the sealing means of said bag mouths in underlying relation to the lower faces of said nozzles, said retainers being stiffened in their elongated dimension and having flange means for positioning the same relative to said grid plate openings, and said nozzles and grid plate being provided with clamping means for securing said nozzle, bag mouth and retainer assemblies in marginally sealed relation to the openings in said grid plate.

Abrasive Belt Attachment for Abrasive Wheel Machines

U. S. Patent 2,612,007. *Sept. 30, 1952. R. M. Bell, assignor to Hammond Machinery Builders, Inc.*

A belt attachment for a wheel type polishing machine having a polishing wheel shaft projecting from a cylindrical housing comprising, an arm having a split clamp at its inner end attachable to said housing in angularly adjusted position therearound, a bracket secured to the outer end of said arm and having a laterally projecting portion, a supporting rod slidably received in said lateral portion and parallel to said arm, a pneumatic cylinder and piston associated with the inner end of said rod to urge said rod axially outwardly, a belt supporting fixture of outwardly U-shaped cross section secured to the outer end of said rod, a pair of slide rods transversely slidably mounted in the ends of the arms of said fixture, a pair of end frames carried by the ends of said slide rods and having shaft receiving yokes formed at their outer ends, a pulley shaft supported in said yokes and vertically adjustably mounted in one of said yokes, a lateral adjusting screw threadedly engaged with one of said frames and yieldably abuttingly engaged with said fixture for laterally adjusting said end frames on said fixture, an arm projecting laterally from said fixture and having a depending pin positioned alongside of said bracket, and an angular adjusting screw threadedly engaged with said bracket to bear against said pin to adjust said pin and arm angularly about the axis of said rod.

Vacuum Metallizing

U. S. Patent 2,610,606. *Sept. 16, 1952. E. Weber and S. A. Johnson, assignors to Polytechnic Institute of Brooklyn*

In thermal evaporation apparatus, the combination of a bell jar having a base plate, a vaporizing part of said jar, a plurality of vertical rods supported on said plate within said jar and having their upper ends located in a common plane, a carrier jig removably supported upon the upper ends of said rods and including a curved carrier supporting structure having a curved carrier supporting structure having its center of curvature located substantially at the location of said vaporizing filament, a heater unit comprising an inverted metallic box positioned above said carrier jig and having the open edge thereof resting upon said jig, whereby said box entirely surrounds said carrier supporting structure of said jig, a heater element mounted within said box above the said carrier supporting structure, and a metallic cylinder closed at its upper end and being removably supported upon said metallic box with the open end thereof extending downwardly to surround and enclose said carrier jig and said heater unit.

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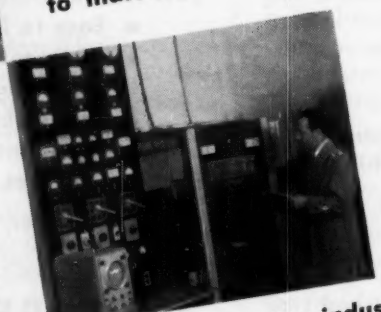

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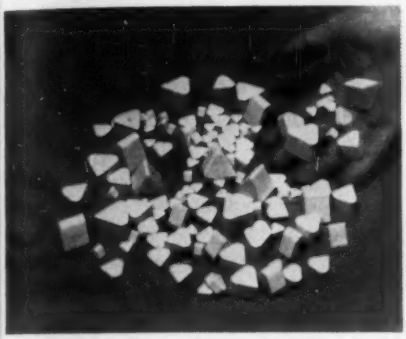
New Methods, Materials and Equipment for the Metal Finishing Industries

Recent Developments

Barrel Finishing Media

Crown Rheostat & Supply Co., Dept. MF, 3465 North Kimball Ave., Chicago, Ill.



Crown Pebs, a newly developed media for barrel tumbling, de-burring, and finishing are now available. They are being used in a wide variety of de-burring and tumbling operations.

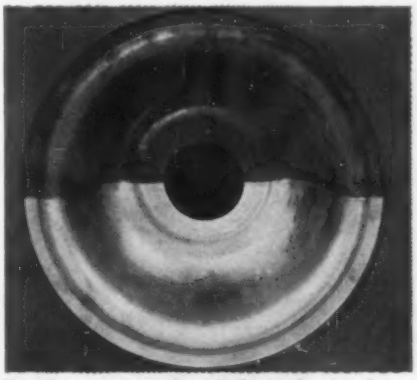
These Pebs, made of tough white ceramic, are of uniform size and triangular shape. They are available in a variety of sizes. By selecting the proper size, the "lodgement" hazard, encountered when conventional random shaped natural or synthetic stone chips lodge in holes and slots, is eliminated. This, in turn, eliminates the need of an extra operation to remove the lodged material. The uniform shape and density of the chips produces uniform processing results. The manufacturer states that the tough wear resistant ceramic used in the manufacture of Pebs insures a service life several times longer than either natural stones or aluminum oxide type of tumbling chips. Because of their uniform size and shape, they can be quickly and easily screened to separate one size from another, and from the work being processed.

Acid Derusting and Descaling Compound

Enthone, Inc., Dept. MF, 442 Elm St., New Haven, Conn.

Enthone has announced a product called Descaler 2A for rapid removal of oxide and scale from steel. The product is acidic in nature and is available in a dry powder form. It is used in concentrations ranging from one to several pounds per gallon with temperatures ranging from 70 to 180° F. depending upon the speed of descaling desired and the type of scale. It is stated that this compound enables controlled acidity to be obtained. This controlled acidity permits uniform pickling with a minimum of attack on the base metal. The surface is left cleaner and brighter than when acids are used.

The product contains surfactants to dislodge oil films, to promote faster pickling and to give white clean surfaces after descaling or derusting. The manufacturer states that the product is ideal for tumble or barrel derusting or descaling. It is also used for removal of rust or scale in vats or tanks, for primary pickling or for plating cycles. A layer of foam forms on the pickling solution which practically eliminates fumes, thus making the pickling or descaling operation more pleasant to the operator and reduces corrosion on surrounding equipment.



Heavily rusted and scaled steel, the lower portion of which has been pickled by Enthone Descaler 2A. Note the clean bright surface that results.

Descaler 2A, because it is a free flowing powder, presents much less hazard in handling than those present with the handling of acids, such as hydrochloric or sulphuric acid. The product is available in 100 and 400 lb. containers. Further information on the product can be obtained by writing to the manufacturer.

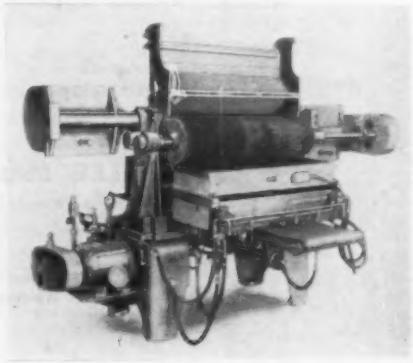
Machine Developed for Surface Finishing Hand Tools

Clair Manufacturing Co., Dept. MF, 1002 South Union St., Olean, N. Y.

The Model 206-A surface finishing machine, a modification of an earlier Clair machine, has been developed specifically for surface finishing wrenches, pliers, screw drivers, ax heads and many other hand tools. This machine is capable of any surface finishing operation, from rough glaze to highly colored mirror reflecting surface.

Equipped for either mechanical holding or the use of a magnetic chuck, the new machine has been re-engineered to increase the horsepower limit to 15, thereby allowing greater surface speeds of the buffs. It also has been strengthened structurally to the extent of 500 pounds of additional weight. To provide for better cooling and less frequent additions of hydraulic fluid, the size of the hydraulic reservoir has been increased 50%.

Controlled by an electro-hydraulic system, this machine is of single roll design—the spindle being 40″ in length, with buffs ranging from 3″ to 12″ in diameter, as required by the geometry of the work being processed. Optional V-belt drive of the spindle permits variable surface speeds. When used with mechanical holding fixtures, the Model 206-A provides a working space 38″ wide and 24″ deep: the largest available magnetic chuck af-



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In many instances the first cost of a Sparkler filter will exceed that of some other types of plating filters.

But the savings in operating cost soon will more than make up for the difference, and you will find your Sparkler a good investment both on the basis of cost and quality of performance.

For example:

★ Pre-coating Sparkler horizontal filter plates requires only about one-third the amount of filter aid used by some other filters.

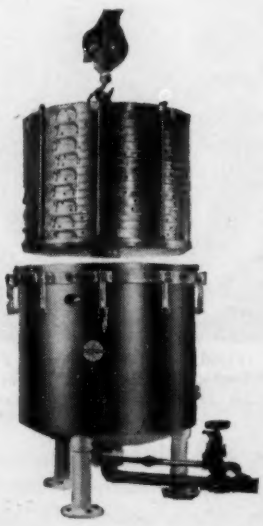
★ Only a thin pre-coat is necessary, and you can get brilliant sharp clarity right from the start.

★ Intermittent operation of the filter will not break up the cake on horizontal plates. No renewal of pre-coating is necessary after a period of inactivity.

★ A wide range of fineness of filter media is possible with Sparkler filters.

★ Sparkler filters are ideal for alloy plating solutions. Non-metallic filter plates and rubber lined tanks are available when required.

These are a few of the many operating advantages that make Sparkler plating filters the most economical in labor and material cost and most satisfactory from a standpoint of filtering quality.



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Sparkler Western Hemisphere Corp.
Mundelein, Ill., U.S.A.

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fords a working area 38" wide and 14" deep.

Among other structural changes incorporated into this new model surface finishing machine are the following: motor counterweight hung on adjustable hinged mounting to provide perfect balance and more sensitive floating action of buff over contours; automatic rewind dust curtain, which protects the longer and heavier main table ways; improved hydraulic, air and electrical control circuits, permitting greater flexibility of operation.

In addition, the magnetic chuck is installed on a three-way adjustable mounting for accurate leveling, incorporating also a hinged angling arrangement. An over-riding third trip permits chuck or table to move forward clear of the buff at completion of final pass, affording greater safety and ease of loading. The Model 206-A machine provides for simple installation of automatic liquid compound applicators.

For additional details on the new Model 206-A surface finishing machine, write the above company.

Exhaust Manifolds and Ducts

American Agile Corp., Dept. MF, P.O. Box 168, Bedford, O.

Corrosion-resistant exhaust manifolds and ducts are now available in all-plastic, fully rigid construction, from the company.

Fabricated from Agilene (polyethylene) or Agilide (unplasticized polyvinyl chloride), both of which offer excellent resistance to the corrosive

action of a great number of chemical reagents, they are made to customer's specification, both of square or round design, and shipped to the site of final installation in easy to assemble sections.

These all-plastic manifolds are of welded construction and can also be installed into existing duct systems.

The outstanding corrosion-resistance, light weight, ease of installation, and long service of such manifolds

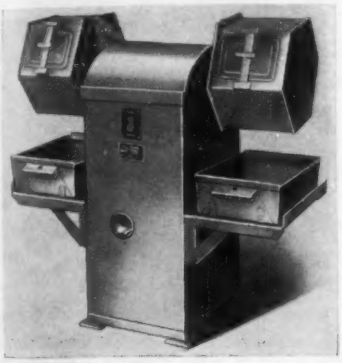
and ducts make them an important tool in the design of exhaust systems carrying corrosive vapors.

For additional information, literature and prices, write to the manufacturer.

New Twinbarrel Finisher

Rampe Mfg. Co., Dept. MF, 3320 St. Clair Ave., Cleveland 14, O.

The manufacturers have rounded out their line of tumbler-mixers by the addition of a standard size twin barrel finisher. This sturdily built machine



will handle steel burnishing balls in both barrels. It has a ball bearing variable speed drive. Power is furnished by a ¾ H.P. 220 volt 3-phase motor. Starting button is completely waterproof.

Standard barrels as furnished with this machine are 10-¾" x 17" size. Larger barrels can be supplied, if desired. Barrels are attached by four bolts each and are furnished either unlined or vinyl plastic lined with safety type cover which prevents pressure from building up in the barrels. Standard equipment includes 2 tote boxes for emptying barrels and perforated covers to permit draining liquid from barrels.

The manufacturers, who will be glad to send complete information, claim this low cost Finisher gives the most tumbling machine for the money.

With unlined barrel $535.00; with lined barrel $615.00. Price F.O.B. factory, Cleveland, O.

High Flash Point Emulsion Cleaner

Pennsylvania Salt Mfg. Co., Dept. MF, 1000 Widener Bldg., Philadelphia Pa.

Pennsalt EC-54 is a new type of emulsion cleaner which will not boil off, evaporate or flash at use temperatures. It will clean non-ferrous metals without tarnishing and will protect

FIND OUT ABOUT IRIDITE® TODAY for finishing ZINC, CADMIUM, ALUMINUM, CUPROUS METALS

WANT CORROSION RESISTANCE? Iridite will give you better-than-specification protection against corrosion.

WANT PAINT ADHERENCE? Iridite provides a firm and lasting base for paint by preventing under-film corrosion.

WANT EYE-APPEAL? Iridite can give you a variety of finishes, depending upon the metal being finished . . . from clear and sparkling bright or military olive drab, to attractive dyed colors.

BEST OF ALL, any Iridite finish is economical and easy to apply.

for example: IRIDITE® (AL-COAT) REDUCES NEED FOR ANODIZING

Simple chemical dip; immersion time only 10 seconds to 2 minutes; no sealing dip; color is clear or yellow depending upon your requirements; salt spray resistance equivalent to 20 to 30 minutes of anodizing, eliminates need for costly racks and electrical power.

WANT TO KNOW MORE? Write for literature and send production samples for free test processing. See "Plating Supplies" in your classified telephone directory or write direct.

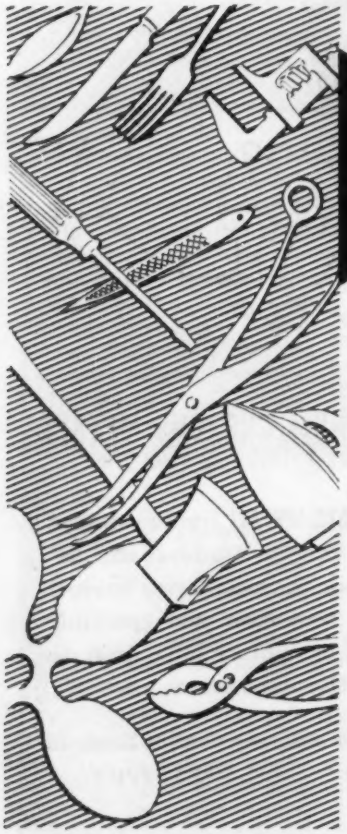
Iridite is approved under government specifications.

ALLIED RESEARCH PRODUCTS INCORPORATED
4004-06 E. MONUMENT STREET • BALTIMORE 5, MD

Manufacturers of Iridite Finishes for Corrosion Protection and Paint Systems on Non-Ferrous Metals; ARP Plating Brightness.
West Coast Licensee: L. H. BUTCHER COMPANY

EXTREME *Versatility*

for Lower Finishing Costs



CLAIR
SURFACE FINISHING
MACHINES

A versatile Clair Surface Finishing Machine may be the answer to economical, production-quality surface finishing of your products. Combining the "touch" of the old time craftsmen with extreme versatility and high speed production, Clair Surface Finishing Machines are soundly engineered and ruggedly built.

By cooperative counsel between your engineers and Clair designers, custom surface finishing equipment may be developed to give maximum efficiency and economy on your metal finishing operation.

May we show how Clair Surface Finishing Machines can save money for you? Write for technical data.

CLAIR MANUFACTURING CO., INC.

SPECIALIZED MACHINE EQUIPMENT FOR GLAZING AND POLISHING OPERATIONS

OLEAN, N. Y.

ferrous parts from in-plant rusting. In extensive field trials, one of them in a large airplane engine plant, this product has proved outstanding in its ability to remove tough soils from difficult to clean parts. The emulsifiable liquid, has a flash point of 260°F., a fire point of 300°F., and 95% boils within a range of 500° to 600°F. Therefore, it will not boil off or evaporate when used at high temperatures in a power washing unit. Its flash point is well above temperatures normally used in emulsion spray cleaning.

Ferrous parts cleaned with EC-54 are protected against in-plant rusting for a period of one to six weeks. This period can be lengthened by the use of stronger solutions and by omission of the rinse following the cleaning stage. On non-ferrous metals, it will not tarnish aluminum, magnesium, brass or zinc. One cleaning unit can be used to process all metals in a given plant.

Pennsalt recommends the use of EC-54 in power washing units at a concentration of from 1-to-20 to 1-to-100 with water, at a pressure of from 15 to 60 p.s.i., at a temperature of from 160° to 200°F., for from ¼ to 2 minutes. For added detergency alkaline cleaners can be added to an EC-54 spray washing solution. For non-ferrous metal cleaning, ⅛ to 1 ounce per gallon of a mild alkaline cleaner, such as Pennsalt A-10, may be used, and for non-ferrous metals alone, ⅛ to 1 ounce per gallon of Pennsalt #30 is recommended for extra cleaning action.

Pennsalt EC-54 is recommended for precleaning in plating and porcelain enameling cycles, for cleaning prior to painting and phosphatizing, for cleaning for inspection, and other similar cleaning uses.

Corrosion Proof Surfacing Material

Ceilcote Company, Dept. MF, 48J Ridge Rd., Cleveland 9, O.

Sample concrete slabs showing Ceilcrete topping usually applied about 1/8 inch thick.

This firm has developed a material, known as Ceilcrete, which is a combination of synthetic liquid resin, inert fillers and pigments and cures into a hard dense stone-like corrosion proof surface which is claimed to withstand trucking, foot traffic and abrasion with a rated load carrying strength about four times greater than that of dense concrete.

Especially adapted for application to walls and floors that are subject to corrosive liquids or atmosphere, such as are found in metal finishing, plating, rayon, cellophane and petro chemical industries.

Ceilcrete is trowelled on the concrete surfaces of tanks, walls, floors. It resists solvents, acids and alkalis, and is non-sparking, non-slip and has high impact strength with remarkable abrasion resistance.

The material, available in black or colors, is usually applied in a single layer ⅛" thick. The small amount of material required adds very little extra to the weight of floors, nor does it appreciably change the elevation.

New Improvements in Dipblack

Special Chemicals Corp., Dept. MF, 30 Irving Place, New York 3, N. Y.

The company announces new, im-

proved features in their Dipblack process resulting in faster production, greater economy and remarkable uniformity on all types of ferrous metals. This is a simple, inexpensive immersion black oxide finish developed during the early part of World War II.

Among the outstanding characteristics of the new process is its versatility of application to all types of ferrous metals resulting in greater savings of time and money. For example, it will produce a uniform, rich black finish on any assembled unit consisting of different types of iron and steel (mild carbon and spring steel). No change in processing is necessary due to the product's compatability with all types of iron and steel. One bath does the job!

Simple control of the solution is afforded by Dipblack Colortrol and Dipblack Anti-Spray. These marked improvements make the solution practically self-controlling. The former, a specially prepared replenishing salt, maintains the solution in proper balance, insuring against off-color deposits, and assures a lustrous, uniform fine black finish on all ferrous products. The latter, an exclusive inhibition agent, protects workers and keeps solution from running down outside of tank.

Dipblack does not affect dimensions or surface texture because it becomes an integral part of the metal itself. It will not chip, peel or scale during or after welding, soldering, bending, punching, stamping or rolling. Alkali, solvents, or high temperature cannot harm metals treated. It increases wear resistance of ferrous metals and also acts as an excellent base for lacquers, varnishes and other organic coatings.

A bulletin describing the process is available on request to the above address.

Air Conditioner

Niagara Blower Co., Dept. MF, 405 Lexington Ave., New York 17, N. Y.

This firm announces the development of improved apparatus for the drying or moistening of atmospheric air by its new "Liquid Contact Method." Air is treated to fix relative humidity and temperature independently, as separate functions, to obtain closer control of results. Filtered fresh air enters a new type of spray chamber providing especially intimate contact between air and the spray liquid. The spray either adds moisture or removes it by absorption or by condensation. The condition of the spray liquid (its temperature or absorbent concentration) determines the moisture content of the air leaving the chamber. The final temperature is fixed as a separate function, either within the apparatus by means of thermostats, without the use of moisture sensitive instruments.

The spray liquid used for removing moisture may be either refrigerated water or the company's "Hygrol," a stable organic absorbent liquid (not a salt) which is automatically held at the proper concentration. When Hygrol is used the latent heat of condensation of the moisture removed may often be absorbed by evaporatively cooled water. The dew point of the air is fixed accurately and final conditions are held automatically constant

SALES ENGINEERING SPECIALIST IN METAL CLEANING —

SERVING

National Lock Co.
American Cabinet Hardware
Borg-Warner Corp., Spring Division
Ekco Products
Stewart Warner Co.
Ray-O-Vac Co.
Moe Light Co.
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J. I. Case Co.
National Steel Container Co.

WALTER H. BERGER
Illinois and Wisconsin Representative of N. Ransohoff, Inc.

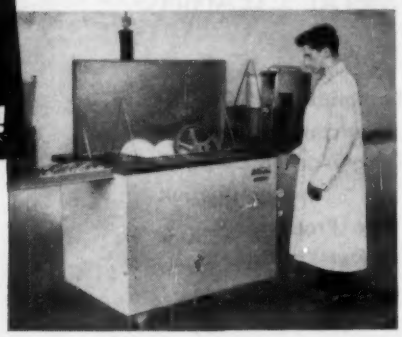
At your service if you are located in his territory.

It takes a specialist like Walt Berger to analytically and creatively solve the metal-cleaning and surface treatment problems of industry. That he has been successful in doing so, is well demonstrated by this famous-name list of those who rely on his practical counsel. Walt Berger's service is significantly Ransohoff service — supported by the fund of technical knowledge gained in 175 years experience on the part of the field and headquarters staffs.

N. RANSOHOFF, inc.
EQUIPMENT FOR THE SURFACE TREATMENT OF METAL
5819 Vine Street **Cincinnati 16, Ohio**

Do a THOROUGH Cleaning Job...

On CHIPS and SOLID DIRT As Well As OIL and GREASE!



Effective, low-reject finishing and plating depend on the removal of stubborn chips, abrasives and other *insoluble* dirt, just as much as on cleaning away oil and grease. Degreasing operations do only part of the cleaning job. Make it a

"One-For-All" Operation

Use the one cleaning machine that provides *mechanical* scrubbing action to augment the solvent and chemical action of the cleaning solution. The Magnus Aja-Lif Cleaning Machine gives you a vigorous shearing and scrubbing action on solid dirt particles, as it moves the work up and down in the solution many times a minute. Each time the direction is changed, the cleaning solution shears away more insoluble chips, abrasives and other particles. You get *really* clean work.

The Fastest Cleaning There Is

It's thorough . . . and it's *fast*—unbelievably fast. Aja-Lif cleaning—with any cleaning solution—is two to ten times faster than any other method. And as to manpower . . . it's a less than one man operation, because the operator can do other work while the machine automatically cleans.

For complete information, write for Bulletin 703-AL—or a demonstration on your own work.

MAGNUS CHEMICAL CO. • 11 South Ave., Garwood, N. J.
In Canada — Magnus Chemicals, Ltd., Montreal.
Service representatives in principal cities.

Magnus
CLEANERS • EQUIPMENT • METHODS

or varied by either adding or removing moisture in response to changing the instrument setting.

Applications include the establishment of dry atmospheres for protection, processing or drying of moisture sensitive materials, testing materials, and conditioning of air for human welfare. In such comfort air conditioning applications the method makes possible the furnishing of large amounts of fresh dry air with the moisture removed at low cost, permitting the cooling or heating to be done economically with room conditioners of any type with superior results.

Do-All Stock Rack

The Artisan Company, Dept. MF, 97 Crosby St., New York 12, N. Y.

The above concern has a new type rack with which they claim you can increase production, speed up delivery and improve quality. They are copper spline 30", 72 phosphor bronze contacts and have a baked insulation of ¼" thick rubber which is said to shed all acids and solutions. The racks are $8.75 each, and if dimensioned sketches of tanks and the items to be processed are submitted, free estimates and drawings will be sent.

Improved Work Glove Coating

Edmont Manufacturing Co., Dept. MF, 1276 Walnut St., Coshocton, O.

An improved Neox coating (reinforced neoprene) is now being used on Edmont's complete line of black NEOX coated fabric work gloves. The new formula is more flexible and has better gripping qualities. It is produced by using special additives with a neoprene base. It is far more resistant to cuts, abrasions, grease, acids, caustics, solvents and heat than neoprene alone. Two weights of coatings are available to meet a wide range of service requirements. Full range of styles from knitwrists to 14" gauntlets. Fully or palm coated.

Maintenance Coating

Flexrock Co., Protective Coating Division, Dept. MF, 3665 Cuthbert St., Philadelphia 4, Pa.

Flexcoat Maintenance Coating was developed to meet the needs of industry for a coating which would give protection against corrosion caused by atmospheric conditions, vapors, fumes, spillage and splash of chemicals which destroy expensive machinery and equipment. It meets these requirements by giving excellent protection against corrosion caused by acids and alkalis, can be brushed, sprayed or dipped, can be applied over old paints, has good adhesion to metal, wood or concrete, and has a wide range of colors to decorate and identify machines and pipelines.

The material is truly a plastic resin finish. It contains no oxidizing oils, or resins. Drying entirely by solvent evaporation, no change takes place in the film as it ages to lower its inertness to corrosive products. Flexcoat is a complete system, primer and top coat are absolutely homogeneous. There is no possibility of intercoat separation. It overcomes the difficulty experienced with most highly chemical resistant finishes—lack of adhesion, and the ad-

hesion is maintained over a wide range of temperatures.

New Hand Cleaner

Magnus Chemical Co., Inc., Dept. MF, Garwood, N. J.

Magnus announces the introduction of Cob Hand Cleaner, an addition to its line of hand cleaners.

This product is a light weight free flowing powder containing corn cob meal as the abrasive. It is ideal for use by female employees or those desiring a cleaner with a soft, mild abrasive. At the same time it really cleans dirty hands, at a cost of less than 1/10c per wash.

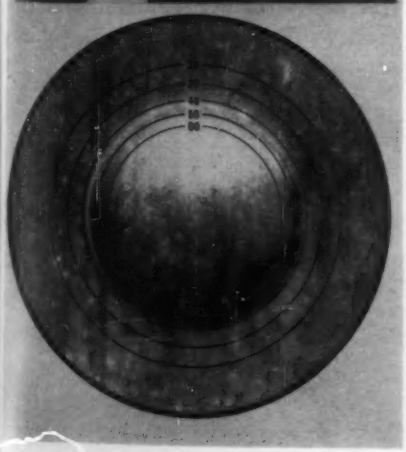
The cleaner contains lanolin and the toilet grade soap used is of mild (pH 7.5) alkalinity. It produces a good lather, and rinses readily. Unlike many vegetable type cleaners, it will not rot, ferment, attract vermin or clog drains.

The new cleaner is sold in bulk only, in 185 and 90 pound drums. A free sample will be supplied upon request on company letterhead.

Pocket Hardness Tester

Pacific Transducer Corp., Dept. MF, 11921 West Pico Blvd., Los Angeles 64, Calif.

A new low cost portable pocket hardness tester for determining the hardness of steel alloys and other metals in the range of from 25 to 65 Rockwell "C" scale is announced by the above company.



The test set features portability. It can be carried in the pocket on the job. It may be used to test specimens of steel alloy in almost any place or position. It is a direct reading device. No further calculations are required. This makes the unit particularly fast in operation.

The test includes a microball indentor, a measuring microscope and a standard hardness test block. It operates by means of an impact indentor which drives a $\frac{1}{16}$" tungsten carbide ball a short distance into the sample to be tested. The diameter of the indentation is then measured by the reticulated microscope. As the diameter is a function of the hardness, the reticle indicates the hardness directly. It is accurate $\pm$ 1½ points "C" scale.

It lends itself particularly to use by field engineers, maintenance engineers, sales engineers and plant engineers. It is particularly adapted for testing all parts of large dies, punches and large welds as well as for structural steel, tanks and large pipes in position where only a portable hand tester of this type can be used. The net price of the unit is $69.00.

New Development in Cold Cleaners

E. F. Houghton & Co., Dept. MF, 303 W. Lehigh Ave., Philadelphia 33, Pa.

Industrial metal cleaning can be

NOW
Wet sanding with discs on the new FASTCUT PAD 85 ASSEMBLY by CARBORUNDUM

Wet sanding with discs—a new, labor saving sanding method—is now possible with the new FASTCUT Pad 85 Assembly by CARBORUNDUM. The 8" diameter FASTCUT Waterproof Paper disc by CARBORUNDUM used with this assembly has many more cutting points than quarter size sheets used in hand sanding, or cut sheets used on vibrating sanders. Thus you can sand a much larger surface in the same time.

With this new method, finger marks are eliminated, giving a better finishing surface. Output per man increases while operator fatigue is lessened considerably. And it's simple to make the changeover in equipment.

Find out all the advantages offered by the FASTCUT Pad 85 Assembly and FASTCUT Waterproof Paper discs—from your CARBORUNDUM distributor, or by sending the coupon.

- Better finishes in far less time
- Increased production at no increased cost

CARBORUNDUM
TRADE MARK
the ONLY source for EVERY abrasive product you need

THE CARBORUNDUM COMPANY, Dept. MF 82-37
Niagara Falls, New York

Please send me Engineering Bulletin No. 405 on the FASTCUT Pad 85 Assembly.

MAIL TODAY!

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82-37

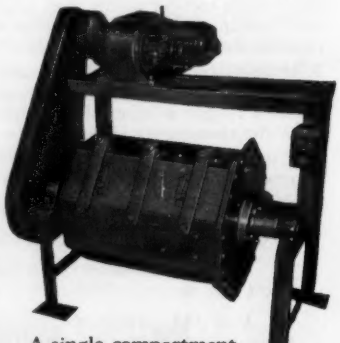
IT'S A FACT...

"There's no single tumbling barrel — or one barrel speed — that will satisfy all types of tumbling requirements."

BUT... there is ONE source of Supply for reliable tumbling barrels and equipment to meet every tumbling need.

HENDERSON BROTHERS offers, from a wide range of tumbling equipment:

- a set speed drive—*for long production runs.*
- a variable speed unit—range 8 to 40 RPM on tilting or horizontal barrels—*for job shop* or *job lot tumbling.*
- horizontal unlined cast barrels or steel tilt-type barrels—*for grinding.*
- wood or rubber-lined horizontal or tilt-type barrels—*for polishing and burnishing.*



A single compartment wood-lined barrel.

Since 1880 Designers and Producers of Tumbling Barrel Equipment.

THE HENDERSON BROS. COMPANY
135 S. LEONARD ST., WATERBURY, CONN.

streamlined into a low cost but highly efficient process with the aid of cold cleaners recently developed by the Metal Research Staff of the company. Used at room temperature in power washers, the new Houghto-Clean 439 and 440 combination effectively removes such soil as heavy drawing oils, pigmented drawing compounds, sulphurized cutting oils, rust preventives, and polar type smuts from ferrous metals, copper and brass.

Because no heat is required, this cold cleaning team lowers operating and maintenance costs. Steam lines, ventilators, stacks, exhaust fans, etc., can be eliminated. As there is no steam or toxic "mist" involved, these new products also help improve shop conditions. Other advantages proven in use are: long lasting stability which provides extra economy; protection against rust; simplicity of preparation and use.

A descriptive 4-page leaflet completely describing these new cold cleaners can be obtained without charge by writing the above company.

Oxide Removal from Copper Alloys

Enthone, Inc., Dept. MF, 442 Elm St., New Haven 11, Conn.

The removal of cuprous and cupric oxides from the surface of copper and copper alloys that have been subjected to high temperatures is a serious problem to industry. Cupric oxide dissolves rather readily in most cases but cuprous oxide, which is red in color, is attacked by various acid reagents only very slowly. Because of this, industry has employed for years oxidizing acid mixtures that undermine the base copper to free the oxide rather than employing a chemical that will dissolve the oxide itself. Mixtures containing sulphuric acid with chromic acid or dichromates are standard for scale removal from copper. However, this mixture attacks the copper and after the scale has been removed, a deeply etched pattern may be left that mars the finish and makes it difficult or impossible to buff or burnish the surface to a high luster. The procedure is also unsuitable for removing cuprous oxide from thin sections of copper or copper alloys.

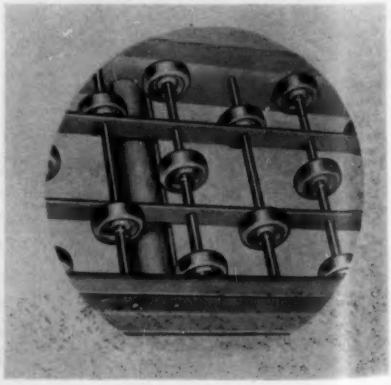
A procedure developed by the company eliminates the use of acids and the preferential attack on the base metal. The procedure involves converting the cuprous oxide to cupric oxide by the use of Enthone's Ebonol "C" Process. (U. S. Patent Nos. 2,364,993 — 2,460,896 — 2,460,898 — 2,481,854). The black cupric oxide that is formed by the use of the treatment is easily removed by means of dilute acids, such as dilute sulphuric acid or by sodium cyanide. If the oxide is heavy, the cycle is repeated several times until the clean bare copper alloy surface is exposed. The process has been found applicable to pure copper, tin-bronzes, phosphor bronzes, brasses, and various copper alloys containing silicon and aluminum.

Full details regarding the procedure as well as information on the Ebonol "C" process for blackening of copper and copper alloys can be secured by writing to the company.

Steel Wheel-Aluminum Frame Gravity Conveyor

The Rapids-Standard Co., Inc., Dept. MF, 342 Rapistan Bldg., Grand Rapids 2, Mich.

A new steel wheel-aluminum frame gravity conveyor that combines



strength with lightness has just been announced by the manufacturers. This model answers the need for a highly portable conveyor that has the durability to stand up under heavy loads.

The new conveyor is manufactured in 45 and 90 degree curves, 5, 8 and 10 foot lengths, and 12 and 18 inch widths. It is available with a wide choice of wheel spacings ranging from 6 to 18 wheels to the foot.

A five-foot section 12 inches wide with 8 wheels to the foot weighs only 23 pounds, yet will support a half-ton distributed load. Prices are substantially lower than on the comparable all-aluminum models, even with the 6 to 10% aluminum conveyor cost reduction recently announced by the company.

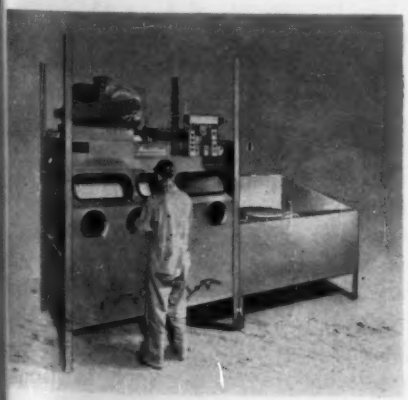
Full information and specifications on the new Steel Wheel-Aluminum Frame conveyor may be had by writing the above company.

Wet Blasting Machine

American Wheelabrator & Equipment Corp., Dept. MF, 1150 S. Byrkit St., Mishawaka, Ind.

Known as the Model 64 Liquamatte, this new model is intended for all precision cleaning and finishing applications involving large and heavy pieces. The machine, 6′ long, 6′ 10½″ deep and 8′ 11″ high, will handle single pieces or loads of pieces up to 3,500 lbs. in weight. It has two 49″ x 36″ counter-balanced doors and has a 6 ft. long accessory tank to receive the parts from the blast chamber for rinsing.

The Model 64 has two sets of armholes so that two operators can be accommodated at once, if necessary. Otherwise, one operator can occupy any one of three positions. There are three abrasive nozzles, individually controlled, ready for use at any time. Different sized jets in each nozzle makes for optimum versatility.



The operator stands outside the cabinet, with his arms extended through gauntlets, and manipulates the abrasive gun and the work table with his hands while operating the compressed air valve with his knee. When blasting is finished, he rolls the work car out onto the power rinse tank (tracks run the entire length of the blasting compartment and rinse tank) where the work is rinsed with water raised by a pump through a hose. Ferrous parts are rinsed in inhibited water. Immersion heater units are available for the water, so that parts dry faster and there is less chance for oxidation.

Further information may be obtained by writing the above manufacturer.

We have fewer rejects since we installed a BLAKESLEE metal parts washer
NIAGARA METAL PARTS WASHERS assure 100% grease-free surfaces for subsequent finishing operations. Blakeslee sprays are designed to reach all surfaces. Each machine is designed to do your cleaning job thoroughly. You can depend upon Blakeslee engineering experience to solve your particular cleaning problems. "We have fewer rejects since we installed a BLAKESLEE metal parts washer."
Write today for full information
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CHICAGO • NEW YORK • TORONTO
BLACOSOLV the highest stabilized degreasing solvent
1844 So. 52nd Ave.
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SOLVENT VAPOR DEGREASERS in standard or special conveyor models
NIAGARA-METAL PARTS WASHERS—built to fit your needs
CANADA
G. S. BLAKESLEE & CO., LTD.
18 Cranfield Rd.
TORONTO 13, ONTARIO

Improved Sump Pump

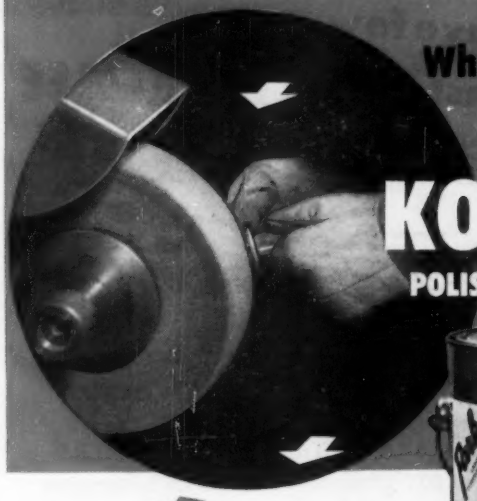
F. E. Myers & Bro. Co., Dept. MF, Ashland, O.

A new improved sump pump with a discharge capacity as high as 3050 gallons an hour has been introduced by the company, nationally known manufacturer of water systems, pumps, sprayers and water softeners.

Designed primarily as a cellar drainer, the sump pump is completely satisfactory for many other services, according to company officials, such as draining pits, boiler rooms, sub-basements, elevator shafts and similar service.

The vertical centrifugal pump features all bronze construction, a hydraulically balanced impeller, and a

Wheels CUT FASTER, LAST LONGER



When treated with *Park*

KOLD-GRIP

POLISHING WHEEL CEMENT

KOLD-GRIP Polishing Wheel Cement, laboratory-controlled through every step of production, will arrive at your plant *ready for use!* Viscosity is constant, regardless of normal temperature variations and the cement can be applied directly from the container . . . *without mixing or heating.* Kold-Grip is clean, odorless and very easy to handle.

Coarse or fine-grain abrasives set up right for fast cutting efficiency. Substantial savings are effected through longer over-all wheel life, fewer set-ups and reduced wheel inventory.

Wheels dry rapidly, are unaffected by humidity changes, and may be stored in any convenient plant area.

Let our polishing engineer demonstrate Kold-Grip for you, or send for free sample, telling us the metal to be polished, grain sizes to be used, and drying facilities available. We can help you if we hear from you.

• Liquid and Solid Carburizers • Cyanide, Neutral, and High Speed Steel Salts • Coke • Lead Pot Carbon • Charcoal • No Carb • Carbon Preventor • Quenching and Tempering Oils • Drawing Salts • Metal Cleaners • Kold-Grip Polishing Wheel Cement

LICENSED MANUFACTURER: Electric Resistance Furnace Co., Ltd., Weybridge, Surrey, England

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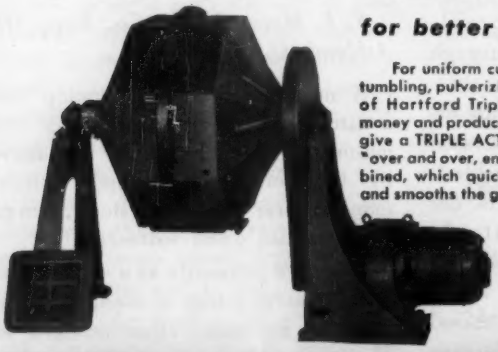
CHEMICAL COMPANY
8075 Military
Detroit 4, Mich.

HARTFORD *TRIPLE ACTION*

CUTTING *and* TUMBLING BARRELS

for better work in less time!



For uniform cutting down, wet or dry grinding, tumbling, pulverizing and mixing, the unique design of Hartford Triple Action Barrels saves time and money and produces better results. Hartford Barrels give a TRIPLE ACTION in tumbling the material, an "over and over, end to end, folding-in" motion combined, which quickly grinds off burrs, and finishes and smooths the general surface of any article in the load. These barrels are available in two sizes, large and small, and with both motor and belt drive. Hartford also makes steel burnishing balls scientifically correct in design and material for each specific job. Bulletin on request.

THE HARTFORD STEEL BALL CO.

HARTFORD 6, CONN.

DETROIT	CHICAGO	NEWARK, N. J.	LOS ANGELES, CAL.	EXPORT
W. S. TURNER	VICTOR R. CLARK	GUARANTEE TRUST BLDG.	E. D. MALTBY CO.	R. A. RODRIGUEZ, INC.
903 NEW CENTER BLDG.	605 W. WASHINGTON BLVD.	972 BROAD ST.	1719 SOUTH FLOWER ST.	55 W. 42ND ST., NEW YORK

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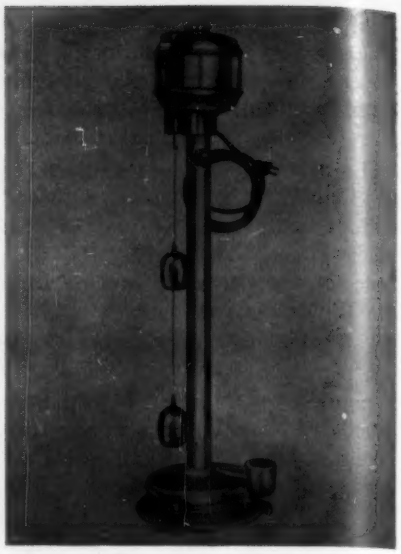


stainless steel shaft. The ball-shaped base and strainer protect the pump from clogging. The strainer can be cleaned without removing the pump from the sump. Other features include an Oilite self-lubricated lower bearing, standard Nema ⅓ H.P. continuous duty induction type motor with built-in overload protection and a rubber covered eight foot cord and plug. The switch is operated by two non-breakable plastic weights, connected by strong flexible Monel cable. The weights can easily be adjusted to any liquid operating level.

Improved Safety Solvents

John B. Moore Corporation, Dept. MF, P.O. Box No. 3, Nutley 10, N. J.

Available are Orthosene, Per-trolene and Frigisol 'safe' safety solvents for electrical, mechanical and metal parts degreasing. All three solvents are designed to replace carbon tetrachloride and are marked improvements over safety solvents heretofor available, according to the above manufacturer.

Orthosene is a slow drying solvent having high flash point (175°F. Tag. closed cup) and excellent degreasing quality without leaving residual oily film. Per-trolene is a rapid drying solvent, having a flash point of 140°F. (Pensky-Martin closed cup) which has wide application throughout electrical and mechanical maintenance shops where 'dry' drying and exceptional degreasing qualities are essential to proper maintenance. Frigisol is, as well, a rapid drying safety solvent, similar in many qualities to Per-trolene, but also capable of displacing water. Frigisol, too, has an unusually high flash point (235°F.) which makes it applicable to many spot locations

where lower-flash solvents might present fire hazards.

The safety qualities of all three solvents have been improved by eliminating toxic inhibitors, as well as harmful isomers normal to some chlorinated products and are available in 55 gallon drums, as well as in tank car quantities.

Floor Resurfacing Compound

The Monroe Co., Inc., Dept. MF, 10703 Quebec Ave., Cleveland 6, O.

The addition to *Swift-Floor* plastic floor resurfacing compound of a new cohesive agent which is reputed to produce a harder yet more resilient floor surface, is announced by the company.

Know as Cryptolite, the tough new material is a mineral which occurs in the form of irregularly shaped crystals. These pack together in Swift-Floor to form an unusually hard, non-skid floor surface which permits the heaviest loads to roll easily and with a minimum of effort just 60 seconds after application, the company states.

Because of its binding qualities, the new floor resurfacer with Cryptolite is said to be extremely easy to apply by simply priming the old floor surface, filling with the material which is furnished ready for application, and tamping or rolling to a hard, smooth, non-skid surface which will immediately withstand the heaviest traffic.

Originally marketed 10 years ago as the first plastic instant use flooring

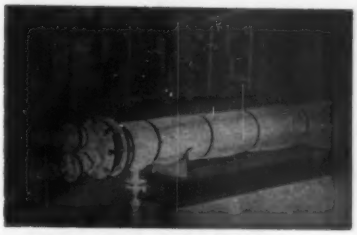
compound, it can be applied over wood, concrete, brick or steel floors, indoors or out. The company states that it is fire and spark-proof and easy to clean.

Further information may be obtained by writing to the above address.

Here's How You Can Solve Your Acid Heating Problem

in a hurry!

Investigate the many outstanding performance features of *HEIL* Impervious Graphite *"NOCORDAL" Units.**



Shell and Tube Exchangers with "NOCORDAL" Tubes. Standard sizes for ready selection. Also available with nickel, steel and other alloy tubes.

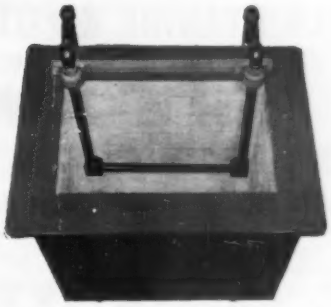
1. LONGER SERVICE LIFE

"NOCORDAL" is inert to most strong acid solutions. Ideal for iron plating as well as Bright Nickel Baths, Hydrochloric and other strong acids.

"NOCORDAL" Grid Heater provides excellent circulation of solution around heating surface. Rugged construction gives longer service life.

2. MORE EFFICIENT OPERATION

"NOCORDAL" possesses the highest heat transfer rate of all non-metals and higher than most metals. This means real savings to you because of more efficient operation.



"NOCORDAL" "U" Coils. These immersion units also available in "L" shape and bayonet style.

3. LOWER INITIAL COST

This wide selection of standard designs will fit practically all applications with efficient pre-engineered units.

Products of HEIL PROCESS EQUIPMENT CORP. are sold by all leading Electroplating Jobbers.

Specify **HEIL "NOCORDAL" units to solve your heating problem.**

**Trade Name*

Other HEIL Products Include

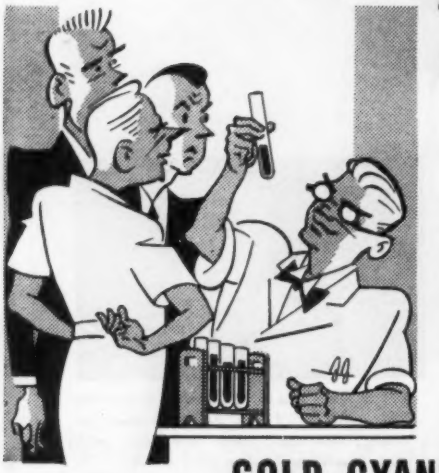
LEAD ANODES • TANKS LINED WITH RUBBER, KOROSEAL, LEAD • LINED FUME DUCTS • PLASTIC CONSTRUCTION • LINED DRUMS • ACID PROOF MAINTENANCE MATERIALS • LEAD FABRICATION

HEIL PROCESS EQUIPMENT CORP.
12901 Elmwood Ave. Cleveland 11, Ohio

APW

Submit your **PROBLEMS** *to our*

RESEARCH DIVISION



During over three-quarters of a century of experience in the refining of precious metals for industrial use, The American Platinum Works has built up an extremely competent staff, capable of handling and solving the most complicated problems which frequently arise in gold and silver plating. Our Electrochemical Research Division has been of great value to many who buy from us. It is ready to serve you, too. Why not take advantage of it?

GOLD CYANIDE SALTS
Available in the various percentages of gold content.

"A.A." SILVER ANODES
Specially developed for better performance.
Less scrap. Less rejects.

C. P. SILVER NITRATE
Meets A. C. S. Specifications.

SILVER CYANIDE & POTASSIUM SILVER CYANIDE
Uniform particle size. Dissolves faster.

THE AMERICAN PLATINUM WORKS
231 NEW JERSEY R. R. AVENUE NEWARK 5, N. J.

use *Electro-Glo* ELECTRO-POLISHING CONCENTRATES

SAVE TIME . . . SAVE LABOR . . . INCREASE PRODUCTION
SMOOTHS . . . BRIGHTENS . . . DEBURRS

Removal of metal can be controlled down to .0002 of an inch.

COPPER ALLOYS	ELECTRO-GLO #200
AUSTENITIC STAINLESS STEEL	ELECTRO-GLO #300
MARTENSITIC STAINLESS STEEL	ELECTRO-GLO #400
CARBON STEEL	FERRO-GLO #500

WRITE FOR COMPLETE DETAILS
Electro-Glo COMPANY • 1428 SO. TALMAN AVE. • CHICAGO 8, ILL.
DISTRIBUTED BY
WAGNER BROTHERS, INC. 400 Midland Ave., Detroit 3, Mich.
BAKER DISTRIBUTING COMPANY 1105 W. 11th St., Cleveland 13, Ohio

Fingers Protected Against Crushing By New "Ball-Tip" Glove

The Boss Mfg. Co., Dept. MF, 221 West First St., Kewanee, Ill.

By an ingenious combination of extra-long leather fingers and a five-eighths inch steel ball stitched securely into the end of each finger, the company has discovered a practical way to protect all four fingers of a worker's hand in the same general way that safety shoes protect toes against painful costly accidents.

The new glove is especially designed for handling heavy metal sheets and shapes, and is available through the nation-wide network of Boss Glove distributors as "Boss Ball-Tip Gloves."

Two styles are available — No. 1501 with a 5-inch gauntlet cuff and No. 1502 with a 2½-inch safety cuff. Both styles have full-leather fingers and patented Boss Norip Thumb construction for extra wear. Steel balls of ⅝" diameter are securely stitched into the ends of all-leather fingers, which are cut extra-long to give plenty of room for the worker's fingers.

In order to make it easy for safety directors and production managers to do their own job-testing on this new glove, sample orders are being accepted for single pairs. In this way, Boss marketing executives feel that the new glove will find its rightful and most useful place in protecting America's hand-power. Further information on this new safety glove may be had from the company or its distributors.

Fire Hose Carts

Wirt & Knox Mfg. Co., Sedgley Ave., Dept. MF, York & 23rd Sts., Philadelphia 32, Pa.

Fire hose carts that are lighter in weight because of their all-welded construction have recently been developed by Wirt & Knox. These fire hose carts can be brought into action faster

and permit even inexperienced personnel to extinguish or bring fires under control before heavier apparatus arrives. The hose carts offer a compact means for storing hose lines, fire axe, crowbar, nozzle and tools ready for instant use in fighting fires in industrial plants. The carts are attractive in appearance and are strong and durable, giving long service life even under rough usage. They are available with wood or steel wheels.

Pocket Measuring Microscope

National Instrument Co., Dept. MF, 5005 Queensbury Ave., Baltimore 15, Md.

Optometer tradenames a new 50 power, pocket measuring microscope recently introduced by this company. An engraved scale mounted in the body tube reads directly to 0.002 inch. Estimates can easily be made to 0.0005 inch. Precision, achromatic lenses, fully corrected for color and spherical aberration, result in a sharp image up to the very edge of the field of vision. This handy tool is about the size of a fountain pen and is easily carried in the pocket.

To use, the Optometer is placed on the surface of the part to be inspected and a light directed obliquely toward the tapered opening. The focusing knob is moved back and forth until the object is in focus. The linear dimension is read directly on the graduated scale. It is priced at $19.50 complete with leather carrying case.

flexibility in
MEAKER DESIGNS
meet every
PLATING REQUIREMENT

ANODIZING
BONDERIZING
PICKLING
LEAD PLATING
CADMIUM PLATING
NICKEL PLATING
CHROMIUM PLATING
SILVER PLATING
CHEMICAL PROCESSING
COPPER PLATING
ZINC COATING

Mechanized handling in the different sequences is the basis of profitable production plating. In the MEAKER designs of automatic plating machines this handling is flexible so that adjustments and modifications are easily made to meet practically every plating requirement. Too, the simple rugged construction insures uninterrupted schedules and minimum maintenance costs.

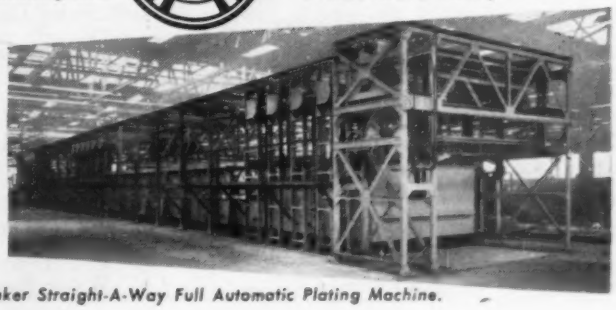
Get full particulars to meet your plating requirements from The Meaker Company, 1635 South 55th Avenue, Chicago 50, Illinois.

MEAKER

- Full Automatic and Semi-Automatic Electroplating Equipment
- Strip Steel Plating Equipment
- Wire Galvanizing Equipment
- Strip Steel Electrocleaning Lines
- Pickling Machines
- Processing Conveyors
- Motor Generators for Plating
- Rectifiers for Plating

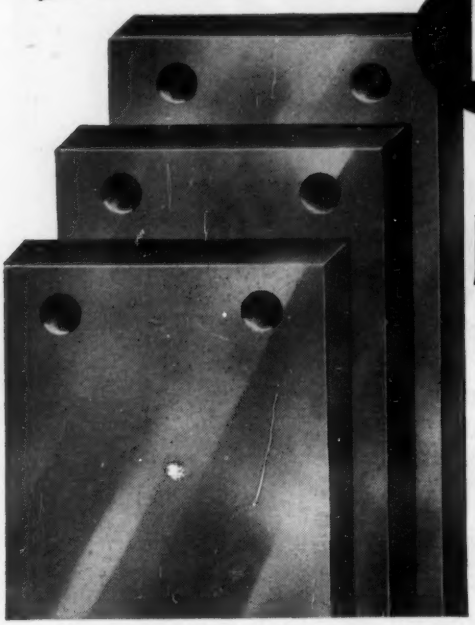
MEAKER PRODUCTS

PLATING EQUIPMENT FOR OVER 50 YEARS



A Meaker Straight-A-Way Full Automatic Plating Machine.

NEXT TIME ORDER



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COPPER ANODES

✓PURE, UNIFORM COPPER

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✓DEPOSITS FASTER & MORE UNIFORM

Call your nearest Hussey Warehouse For Fast Service

OUR 105th YEAR 1848-1953

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(Division of Copper Range Co.)

ROLLING MILLS AND GENERAL OFFICES, PITTSBURGH 19, PA.

7 Convenient Warehouses to serve you promptly!

PITTSBURGH.....2850 Second Avenue
CLEVELAND.....5318 St. Clair Avenue
NEW YORK.....140 Sixth Avenue
CINCINNATI.....424 Commercial Square
CHICAGO.....3900 N. Elston Avenue
ST. LOUIS.....1620 Delmar Boulevard
PHILADELPHIA.1632 Fairmount Avenue

BUSINESS ITEMS

Minnesota Mining Promotes McElroy

Promotion of *Robert W. McElroy* to the newly created position of director of safety and security for *Minnesota Mining & Manufacturing Co.* and its subsidiaries was announced recently.

C. P. Pesek, vice-president in charge of engineering and properties, said McElroy would coordinate all phases of safety, security and fire protection in 3M plants, warehouses and offices and those of 3M subsidiaries.

Pesek also named *Jerome M. Mayer* manager of fire protection.

McElroy has been plant protection manager at 3M since 1945. Prior to that he was director of protection for the Rocky Mountain division of Montgomery Ward & Co. He is chairman of the plant protection division of St. Paul civil defense.

Mayer has been 3M safety engineer since 1945. For 18 years previously he was safety engineering inspector with the National Inspection Co. of Chicago.

Bill Lang Joins R. O. Hull

W. C. Lang is now associated with *R. O. Hull & Co., Inc.*, Rocky River, O., as technical representative in Cleveland. He is a graduate of Penn State in Electrochemical Engineering and was formerly in charge of plating and polishing for the Weatherhead Co., Ward Products Division of the

W. C. Lang

Gabriel Company, and Dominion Electric Company. He brings with him a wealth of practical experience as well as wide technical knowledge for the benefit of the plating industry.

Free Course in Electroplating

The Spring term for the course in *Electroplating* from February to June at the *Brooklyn Evening Technical High School*, 29 Fort Greene Place, Brooklyn, N. Y., will begin on February 2, 1953.

The course includes a review of elementary chemistry, calculations for the preparation of standard solutions, specific gravity, neutralization, pH, hydrolysis, and similar related topics. Laboratory experiments will include analysis of copper, nickel, chromium, and silver baths; chemical and physical tests of electrodeposits, Ohm's law and current efficiency.

Registration for the course begins the week of January 15, 1953 from 7:00 P.M. to 9:00 P.M. Classes will meet Monday and Wednesday 6:45 P.M. to 8:15 P.M. and about six Friday evening. Ask for *Mr. L. Serota* in Room BW17 February 2-3 and in Room 3E10 thereafter. The course is limited to men in the electroplating industry.

Industrial Supplies & Equip. Changes Name

Effective immediately, the name of *Industrial Supplies & Equipment Co.* has been changed to *Tumbling Sales & Service Co.*

This change has been made, first: to more clearly identify the firm with its special field of activity—Barrel Finishing—and second; to avoid all

possible confusion with the many dealers in a wide variety of goods whose names include the words "industrial" or "industrial supplies."

The trade mark TESCO has been registered in the United States Patent Office and will be applied to their *Tesco Tumbling Division* in Meriden, Conn., and to a variety of equipment and other products which will be marketed under their name.

Permutit Plant Expansion

Coincident with the completion of the *Permutit Company's* 1952 program for doubling the capacity of the Birmingham, N. J., works for the production of ion exchange resins, *H. W. Foulds*, president, stated that the company has now placed contracts for further extensions and improvements, including a new laboratory and pilot plant building to cost approximately $200,000 in all.

These new additions are provided to meet increased demands for ion exchange resins and are a part of the company's long-range plan to meet anticipated growth in the use of ion exchange processes in industry and power plants.

Field Engineer for New England Appointed by Richardson-Allen

To assure thorough and quick service for its selenium rectifier installations, *Richardson-Allen Corp.*, Flushing, N. Y., has appointed *Arthur Murphy* as a field engineer for the New England area. Mr. Murphy is well known in this region by virtue of his many years' service in the mechanical and electrical industries. His headquarters will be in Boston at 25 Huntington Ave., phone Kenmore 6-2570.

Arthur Murphy

High Vacuum Equipment Corp. Formed

Announcement of the recent organizing of the *High Vacuum Equipment Corp.* for the development, design, and manufacture of high vacuum equipment used in the fields of electronics, metallurgy, plastics and metals, was made today by *Joseph B. Merrill*, president and general manager of the company.

William O. DiPietro is in charge of the concern's engineering and research activities. Production and purchasing departments are directed by *Walter W. Mueller* and *Rogers G. Welles*. General counsel for the company is *Gerhard Bleicken*, associated with Powers and Hall, Boston, Mass. Mr. Merrill, Mr. DiPietro and Mr. Mueller were formerly associated with *National Research Corp.*, and Mr. Welles was formerly with Estabrook & Company.

Items currently being manufactured by the company, include: vacuum pumping systems, vacuum furnaces, vacuum metallizing units, vacuum impregnating units, diffusion pumps, valves and gauges.

The general offices and factory of the company are located at 349 Lincoln St., Hingham, Mass.

Neo Electroplating Installs Equipment

It has been announced by *Neo Electroplating Ltd.*, 98 Vine St., Hamilton,

METALWASH

A score of custom-built METALWASH machines treat a myriad of ball bearings of different types and sizes every day at the Fafnir Bearing Company Plant in New Britain, Conn.

AT FAFNIR

Because the manufacture of precision ball bearings to exacting specifications demands repeated washings, the Fafnir Bearing Company insists on METALWASH.

The rigid control exercised in ball bearing production is dramatized by METALWASH MACHINERY CORPORATION in the January issue of the *Finishing Engineer*.

Read THE FAFNIR STORY for an exciting close-up of precision ball bearing manufacture.

METALWASH *Finishing Engineer*, published quarterly, is available on request to engineers and executives to whom cleaning and finishing are operations of interest.

Write on your company letterhead for your free copy.

METALWASH MACHINERY CORPORATION
923 North Avenue, Elizabeth 4, N. J.

Representatives in principal cities

Question!
How to Solve Your Thickness Problems?
Answer!
With the New KOCOUR Electronic Thickness Tester!
DETERMINES THE THICKNESS OF METALLIC COATINGS
BETTER! . . . FASTER! . . . EASIER! . . . CHEAPER!
The new KOCOUR ELECTRONIC THICKNESS TESTER is the answer to your thickness problems . . . QUICKLY and almost AUTOMATICALLY . . . this highly accurate instrument can determine the thickness of all the commonly plated metals on various base metals . . . thus putting an end to costly rejects and reworking.
KOCOUR'S NEW ELECTRONIC THICKNESS TESTER HAS THESE OUTSTANDING FEATURES:
● Set is self-contained.
● 90-95% accurate depending upon type and thickness of the plate.
● Average test requires only about 1 minute.
● Minimum thickness determined is 500,000's of an inch (5,000,000 for chromium).
● Maximum thickness determined is indefinite.
● Operates virtually automatically.
● Reads directly . . . no calculations necessary.
● Relatively insensitive to surface roughness.
● Compactly housed in portable metal cabinet, 17½x10½x10".
● Operates from 105-125 volt, 60 cycle, A.C. electric outlet.
Write today for full information . . . no cost or obligation.
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CHICAGO 32, ILLINOIS
Specify KOCOUR TEST SETS from Your Supplier!
Pioneers and Specialists in Testing Equipment Since 1924.
P.S. Whether your set-up calls for small or large volume work . . . there's a specialized KOCOUR SET for your requirements . . . developed to do a faster, better, more economical job.

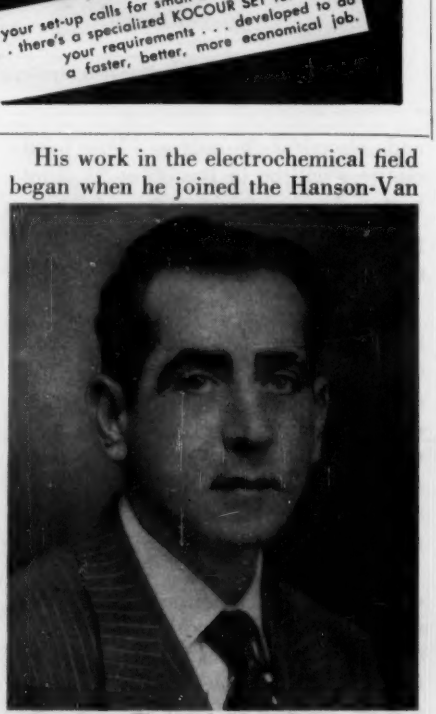
Ont., that they have installed equipment for chromium plating by the "Neo" system.

Hanson-Van Winkle-Munning Appoints Thomas J. Menzel Mgr. Electroplating Section

The Hanson-Van Winkle-Munning Co., Matawan, N. J., announces the appointment of *Thomas J. Menzel* to the position of Manager, Electroplating Section. In his new position, he will be responsible for all experimental and sample plating carried out for customers at the Company's modern plating laboratory.

Menzel has a B.S. degree from Hudson College of St. Peters College, Jersey City, and has completed special courses at New York University.

His work in the electrochemical field began when he joined the Hanson-Van Winkle-Munning Company in 1943 as a chemist, later moving to the post of analytical chemist and then plating chemist. From the latter post, he now advances to his new assignment.



Thomas J. Menzel

Metals Disintegrating Company Appointment

Philip C. King

The appointment of *Philip C. King* as purchasing agent, has just been announced by *Metals Disintegrating Co.*, Elizabeth, N. J., manufacturers of metal powders, metal pigments, and metal abrasives.

Mr. King was previously with the General Aniline Works, Inc., as purchasing agent for engineering. Prior to that he held the post of purchasing agents of the Condenser Service & Engineering Co., Hoboken, N. J.

For a period, Mr. King was active in his own business, operating as the Steel Trading Corporation, of Pittsburgh, Pa. Previous to that, for a number of years, he was purchasing agent for the Vanadium Corporation of America.

Wagner Brothers Appoint Ohio Representative

Wagner Brothers, Inc., Detroit manufacturers and distributors of plating and polishing supplies and equipment, announce appointment of *A. A. Schuenemann* as sales representative for northern Ohio. According to *O. H. Tiedeman*, v.-p. sales, Schuenemann will locate at 6502 York Road, Parma Heights, Cleveland, to handle Wagner business in Elyria, Toledo, Cleveland, Akron, Canton, Youngstown, Mansfield as well as the greater Cleveland area. The appointment is the first in the company's new expansion program.

For the past seven years, Mr. Schu-

enemann has been associated with *Udylite Corp.* as a sales engineer in the same territory and is well known to the plating industry. For ten years prior to that he was with *Harshaw Chemical Co.*, technical sales division. His twenty years' experience in plating also in-

A. A. Schuenemann

cludes engineering assignments with General Electric, Cleveland Wire Works Div., and various positions with job plating plants in Cleveland. He received a degree in Electrical Engineering from Ohio State University in 1930 and is a lifetime resident of Cleveland.

Royal Clark Joins Liberty Optical

Royal F. Clark, Sr. has accepted a position as foreman electroplater with the *Liberty Optical Manufacturing Co., Inc.*, Newark, N. J., manufacturers of Zyl eye glass frames. Mr. Clark was formerly with the *New Jersey Optical Co.*, Irvington, N. J., in the same capacity.

Buffalo Electro-Chemical Elects New President and Other Officers

Dr. Max E. Bretschger, formerly vice-president of *Buffalo Electro-Chemical Co., Inc.*, has been elected president of the company to fill the vacancy created by the death of the late *Charles A. Buerk*, it was announced by *Paul L. Davies*, president of Food Machinery and Chemical Corp. of which Buffalo Electro-Chemical Co., Inc. is a subsidiary.

Dr. Bretschger's long association with Mr. Buerk in the management of the company insures continuation of the policies which have brought Buffalo Electro-Chemical Co., Inc. to its present position of importance in the chemical industry.

Dr. Max E. Bretschger

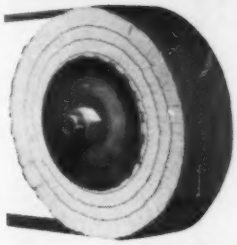
Mr. Davies also announced the election of *Frederick A. Gilbert*, formerly manager of BECCO's Vancouver, Wash. plant, to the position of vice-president. Mr. Gilbert will make his headquarters in Buffalo. *Charles J. Kellogg*, formerly comptroller and secretary, was elected secretary-treasurer.

In addition, *George G. Crewson*, director of engineering, was elected to the board of directors.

McKenzie Co., to Represent DeBothezat

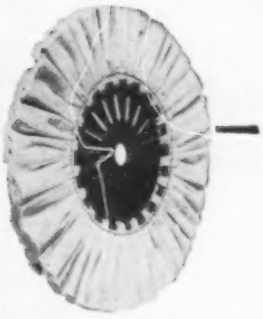
DeBothezat Fans Division of *American Machine and Metals, Inc.*, has announced the appointment of *H. S. McKenzie Co.* as their new representative for Oregon and southern Washington. They will handle DeBothezat's com-

A FEW OF THE MANY
FORMAX
PRODUCTS



STYLE C-20
CONTACT WHEELS
and F-26 Belt Lubricant

A C-20 flexible Contact Wheel will form itself to the shape of the work and permit the abrasive felt to polish contoured surfaces and F-26 Abrasive Belt Lubricant will increase belt life by preventing loading and glazing. Produces finer, smoother and brighter surfaces through lubrication.



ZIPPO BUFFS

These famous long-wearing buffs run cool under all buffing conditions. Constructed of high count bias-cut cloth or sisal mounted on safe steel centers. Available in a wide range of densities and center diameters.

A complete line of buffing compounds in bar form as well as in liquid form for brush or spray application. Also Flex-A-Glu polishing wheel cements.

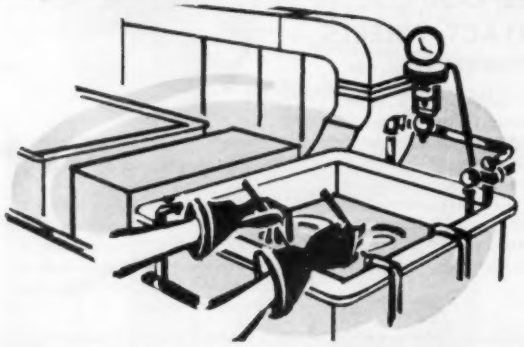
Our Laboratory and Sales Engineering staff would welcome the opportunity to be of help in solving your finishing problems.

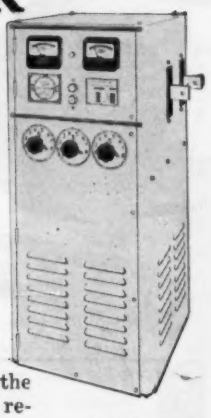
Send for descriptive literature

FORMAX MFG. CORP.
DETROIT 7, MICHIGAN
"THE FOUR McALEERS"

MANUFACTURED IN CANADA BY JOHN GALLOWAY LTD., KITCHENER, ONT.

No Guesswork Here . . .
It comes out right
RICHARDSON-ALLEN SELENIUM RECTIFIER





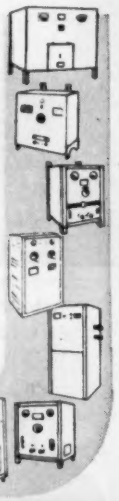
When "it comes out right" consistently, you know the satisfying result — greater output, highest quality, fewer rejects, lower labor costs.

This profitable achievement depends not only on your own skill and ability. It also requires and deserves the most dependable rectifying equipment.

You can assure the dependability of your d c supply by installing Richardson-Allen Selenium Rectifiers which have established records in hundreds of plants for long, trouble-free service.

The Richardson-Allen line includes various types and the widest selection of voltages and currents. For example, all models may be standard or plus rated; there is a choice of basic and remote controls; self-contained; heat exchanger; sequence programming controls; anodizing, and also suitable equipment for manodizing.

There is an R-A factory representative in most major cities. If you do not find him in your phone book, write directly to us.



RICHARDSON-ALLEN CORPORATION

a manufacturing affiliate of

WESLEY BLOCK AND COMPANY, 39-15 MAIN ST., FLUSHING, N. Y.

IN CANADA: Richardson-Allen of Canada, Ltd., 370 Victoria St., Toronto, Ont.

SET IT and FORGET IT

plete line of industrial ventilating equipment, with offices at 100 Northeast Holladay, Portland 14, Ore. (phone Filmore 4305).

Handy & Harman Honor Long-Service Employees

Cortlandt W. Handy, chairman of the board of directors, and *Joseph W. Smith* and *William J. Smith*, both of the New York plant, led the list of twenty-six long-service employees who were honored at a service awards dinner last night at the Drug and Chemical Club sponsored by *Handy and Harman*, refiners and fabricators of precious metals.

Mr. Handy completed 40 years with Handy & Harman this year, with his service record interrupted only when he served with the U. S. Army in World War I. Joseph W. Smith and William J. Smith completed 30 years with the company this year.

Presentation of awards was made by *G. H. Niemeyer*, president, who also spoke briefly. The other speaker was *J. C. Travis*, vice-president and general manager, who discussed the company's plans for the coming year.

The dinner was one of a series of five being held at Handy & Harman plants in Bridgeport, Chicago, Providence, Toronto, and New York.

Other awards made last night included: Fifteen years service—*Robert E. Eurke, Raymond Happel, Helen Herron, James C. Powers*, and *Alden W. Swift;* ten years. *Anne Barteluce, Frank E. Black, Patrick L. Heding, Dorothy Hunter, Ethel Krauss, Ann M. Lawless, Evelyn Lux, Veronica McGee, Andrew McMurray, Virginia Mullany, Jessie O'Meara, Karl A. Reisler, Thomas J. Renny, Ruth E. Rogers, Edward G. Schieferstein, John J. Shears, Garry J. Van Haste*, and *Jeannette V. Wilson*.

Harry Rothman Joins Diesel Chemical

Harry Rothman, formerly with the Central Plating Co., has become connected with *Diesel Chemical Co.*, 243 Fourth Ave., Brooklyn 15, N. Y. He will be sales manager of the plating chemical department.

Appointments Announced at Whittaker, Clark & Daniels

It is announced by *Whittaker, Clark & Daniels, Inc.*, 260 West Broadway, New York 7, N. Y. manufacturers, exporters and importers of non-metallic minerals, pigments and colors that *Arthur N. Sudduth*, as of November 1, 1952 became manager of the company's new abrasive division. Mr. Sudduth will supervise the sales and production of a wide variety of abrasives for the finishing industry.

Mr. Sudduth was formerly the vice-president in charge of Eastern sales and production activities and member of the board of directors of the *James H. Rhodes Co.* until October 1952.

Mr. Sudduth brings with him long and valuable experience in the field of abrasives with special knowledge on pumice, a product of which Whittaker has long been a leading supplier.

When Rhode's president retired in 1923, he turned the entire Jas. H. Rhodes & Co. business and holdings over to six key men employees one of whom was Arthur N. Sudduth. His new duty starting at this time covers

Arthur N. Sudduth

Robert T. Smith

laying out and setting up of a pumice mill, with the subsequent management of production and the various activities pertaining to the continued production of pumice including the sales and promotion.

The company has also announced the appointment of *Robert T. Smith* as executive salesman.

Mr. Smith has been with Whittaker for nineteen years as a salesman, many of which were in Michigan territory. He was succeeded there by *D. R. Leiser*, vice-president of *Harry Holland & Son.*

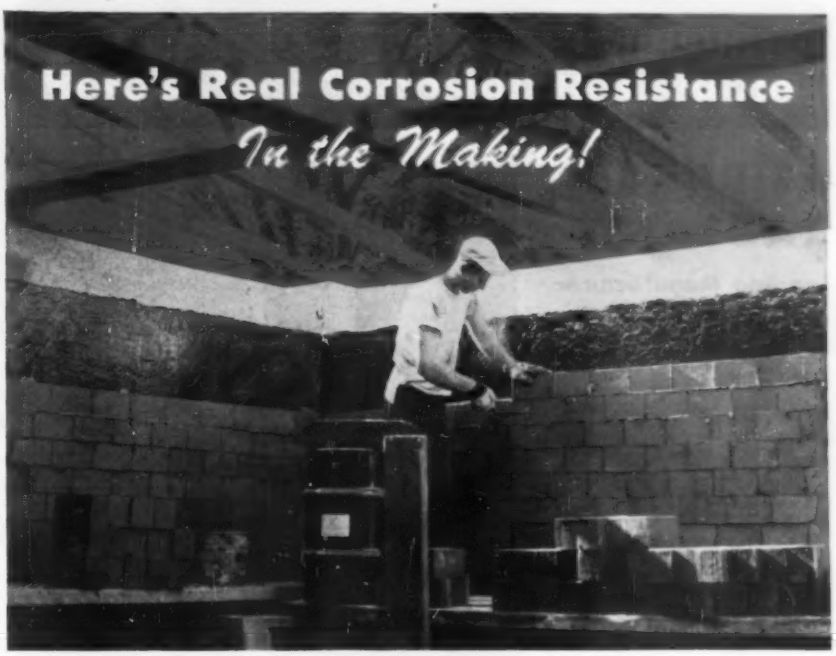
American Cyanamid Appointments

J. D. Lowery, manager of *American Cyanamid Co.'s* heavy chemicals department, announced recently the appointment of three district managers.

Named Eastern District Manager was *J. A. Leek*, formerly New York Metropolitan District Manager for the Industrial Chemicals Division. With headquarters in New York City, he will supervise heavy chemical sales in New England and other Atlantic Seaboard states extending as far south as the west part of Virginia.

Serving as Southern District Manager is *E. J. Adams*, formerly a sales representative for the Industrial Chemicals Division. He will supervise heavy chemical sales in an area extending from Richmond, Va. to and including Texas and Oklahoma. Mr. Adams' headquarters will be in Charlotte, N. C.

W. H. Leon, formerly a sales representative for the Industrial Chemicals Division in the Mid-West, was named Western District Manager for the Heavy Chemicals Department. Mr. Leon, with headquarters in Chicago, will supervise sales of the department in the Middle and Far West.



WHEN Oneida Ltd., famous makers of Community Plate silverware of Oneida, N. Y., installed their big new acid neutralizing and recovery tank — they built it to last.

Wisely, they chose U. S. Stoneware's "triple-construction" acid-proof masonry for the job. "Triple-construction" means three-way protection: protection in the brick, protection in the joints, and protection in the membrane between brick and concrete shell.

U. S. Stoneware's furane-based Durisite cement gives tight, thin, non-porous joints of high compressive strength — and top quality corrosion resistance over a wide temperature range. "U.S." Acid Brick are hard, strong and dense—highly resistant to spalling and erosion. Resilon membrane forms an impervious protective barrier between brick and shell.

For economy in construction, and durability in service, specify U. S. Stoneware "triple-construction" acid-proof masonry — positive protection against chemical attack.

U. S. STONEWARE
Akron 9, Ohio
PROCESS EQUIPMENT DIVISION

530

Safety Solvent Firm Expands Distribution

As of December 1st, according to *John B. Moore*, president, *The John B. Moore Corp.*, Nutley, N. J., warehouse stocks of the company's safety solvents have been installed in Pittsburgh, Pa. and at Detroit, Mich. Production of the company's solvent products is at Clifton, N. J. He also announces the appointment of representatives as follows: For Western Pennsylvania, West Virginia and Western New York State, *Norman M. Gottfried* of Pittsburgh, Pa.: for entire state of Michigan, *The Caldwell Chemical Co., Inc.*, of Detroit, Mich.: West Coast, *Arthur K. Meyer Company*, who will also manage the company's west coast offices at 1206 S. Maple Ave., Los Angeles, Calif.

U. S. Rubber Appoints Parker

Carroll C. Parker has been appointed assistant manager of grinding wheel sales for *United States Rubber Co.'s* mechanical goods division, with headquarters at the company's Fort Wayne, Ind. plant.

For six years Mr. Parker has been doing sales and service work for the grinding wheel division in northeast-

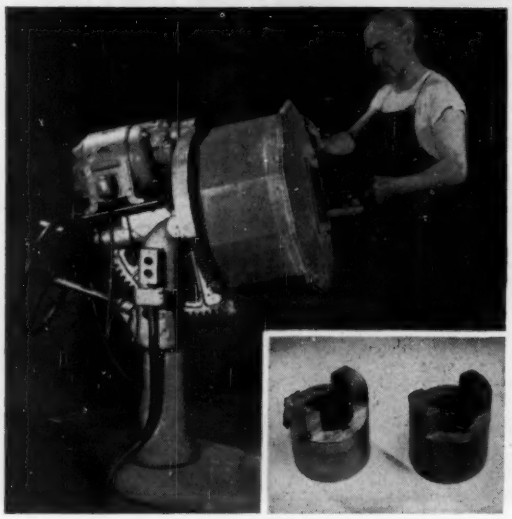
DEBURRING PRODUCTION *increased* 85%

AT BAKER-RAULANG

Leading Manufacturer Of Electric Lift Trucks

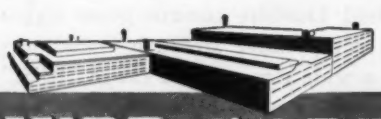
with

GLOBE TILTING TUMBLING BARRELS



Insulating bushings were formerly deburred with emery wheels at a rate of 300 per hour. With use of a Globe Tilting Tumbling Barrel, production was stepped up to 2000 pieces per hour. In addition to an 85% production increase, the tumbling barrel released two men for work in other departments.

Extra economies are obtained by tumbling odd shaped pieces difficult to deburr with hand wheels. With the Globe Tumbling Barrel, Baker-Raulang has doubled deburring production, and is obtaining finer finishes, using only 3 men in place of 5 men formerly required.



FREE EXPERIMENTAL SERVICE

Let Globe's experimental engineering service analyze your finishing problems. Send samples of parts and completed piece to show finish desired and Globe will provide detailed finishing recommendations. Write today! No obligation, of course.

HUPP CORPORATION

GLOBE STAMPING DIVISION

1250 WEST 74th STREET • CLEVELAND 2, OHIO

SERVING INDUSTRY SINCE 1902

James W. Cooke

company's test program. After working on tests which included motor and generator, rectifier, special developments, and turbine and control, Mr. Holt took a position in the materials handling section of control engineering in 1937. He was named head of the marine section in 1941 and became section engineer for aircraft, air conditioning, and appliance sections in 1944.

Four years later he was named sales manager of magnetic devices. In 1950 he was appointed manager of sales-control devices, the position he retained until his recent appointment.

Mr. Cooke has been with General Electric since 1925 when he joined the Test Program after graduation from Viginia Polytechnic Institute. He was transferred to control engineering in 1928 and in 1931 was named line engineer in charge of control for materials handling.

In 1948, Mr. Cooke was made assistant engineer of the industry control engineering section. A year later he was named assistant engineer of the manual and accessory control engineering section, and in December, 1951, he became engineer of that section. He retained the latter position until his recent appointment.

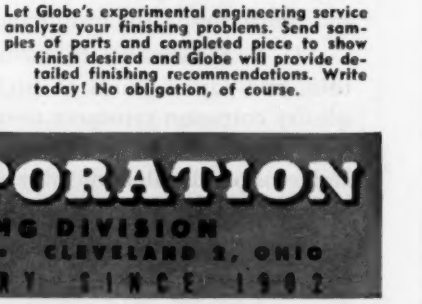
ern Ohio and the western half of New York state. Before that he was a production engineer and was also with the development department. Mr. Parker is a graduate of the University of Maine and was in military service for four years, including two years in the Southwest Pacific as a glider squadron commanding officer.

Two Appointments Announced in G-E Control Department

Two appointments in the *General Electric Co.'s* Control Department at Schenectady, N. Y., have been announced by *Carl A. Salmonsen*, acting general manager of the department.

Frederic H. Holt has been named manager of marketing and *James W. Cooke*, manager of engineering.

Mr. Holt, a graduate of the Missouri School of Mines, joined General Electric in 1935 as an engineer on the



Fredric H. Holt

Hanson-Van Winkle-Munning Appoints L. Joseph Moyes to North-Central Territory

The Hanson-Van Winkle-Munning Company, Matawan, N. J., announces the appointment of *L. Joseph Moyes* to its sales staff. Moyes' headquarters will be in Milwaukee, Wis. and he will service customers in Wisconsin, Minnesota, and upper Michigan. He replaces

L. Joseph Moyes

E. C. Bosl who has been transferred to the company's Chicago office to give electro-chemical service to customers in the midwest.

Moyes brings with him a broad experience of fifteen years in the metal finishing industry. In recent years his particular interest has been in cleaning and pre-plating cycles. From this work he has gained a wide background in all types of buffing, polishing and plating procedures and is well equipped for his new assignment.

American Wheelabrator Moves District Office

American Wheelabrator & Equipment Corp., Mishawaka, Ind., announces that its district office in New York City has been moved to 53 Newark Street Bldg., Hoboken, New Jersey. Telephones are Hoboken 2-8550 and 2-8551.

The move was designed to provide better service to users of blast cleaning equipment, blasting abrasives, chemical and metallurgical dust and fume collectors, and other supplies for foundries and metal-working concerns which are located in the portions of Pennsylvania, New York, Connecticut, and New Jersey served by this office. Sales engineers *David Logan, K. E. Blessing,* and *F. J. Pichard* are assigned to the district.

Al Braun Forms New Firm

Alexander N. Braun, who has been active in the lacquer industry for 35 years, has withdrawn from the *Agate Lacquer Mfg. Co.,* of which he was founder and former president, to organize *Braun Organic Finishes, Inc.,* making quality lacquers and synthetics, at 43-44 Tenth St., Long Island City 1, N. Y.

clean as a whistle

Smooth—Stain-free—Spotless! There's nothing like a dip to brighten and improve the appearance. This applies not only to a four-year-old but also to metal. For junior it's soap—for metal it's Mutual's Chromium Chemicals.

Leading brass manufacturers find a Sodium Bichromate dip, with sulfuric acid, to be the most effective treatment for removing stains resulting from annealing. A metal surface uniformly clean, bright and pleasing in appearance emerges from this bath.

Many other metal treatments employ Bichromate. Used on aluminum and magnesium it contributes to the development of corrosion-resistant films. Mixtures including Bichromate or Chromic Acid are used to form protective and paint-base coatings on iron, steel, zinc, cadmium, aluminum and magnesium.

Mutual's Research and Development Department has a wealth of technical data on the use of Chromium Chemicals in metal treatment. Inquiries are welcome.

SODIUM BICHROMATE • SODIUM CHROMATE
POTASSIUM BICHROMATE • CHROMIC ACID

MUTUAL CHEMICAL CO. OF AMERICA

SINCE 1845 270 Madison Avenue New York 16, N. Y.

Plants: Baltimore—Jersey City

Al is First Vice-President of the Metal Finishing Suppliers' Association

Al Braun

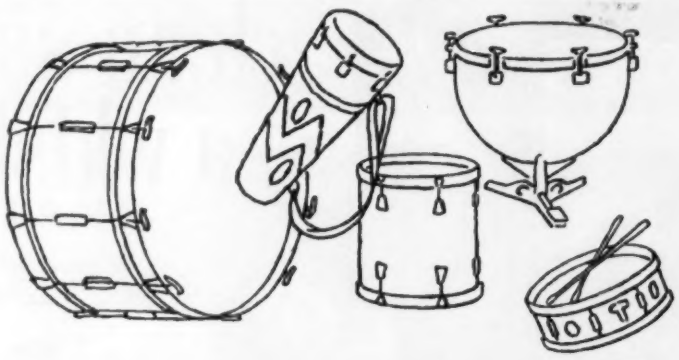
and is also active in the New York Branch of the American Electroplaters' Society.

Diamond Alkali Elects Virden a Director

John C. Virden, nationally-known Cleveland industrialist, has been elected a director of *Diamond Alkali Co.,* large producer of basic chemicals.

Raymond F. Evans, president of Diamond, announced Virden's election following a meeting of the board of directors.

An Alabaman, born in Montgomery, Virden has been a resident of Cleveland for 42 years. He was educated at University School, graduating from there in 1915, after which he saw military service in the World War I, first with a hospital unit, later transferring to the Aviation Corps.



All drums look alike!

We've a point to make — one drum of chemicals looks like the next and there is no practical way for you to prejudge the ability of a drum of chemical to do the job you require. For the most part, chemicals are bought on confidence — on the recommendations of responsible chemical suppliers and their engineers.

For 10 years Klem Chemicals, Inc. has served important large and small manufacturers of production parts and products. Klem has analyzed countless unusual conditions and successfully produced compounds that have enabled industrialists to eliminate bottlenecks and establish profitable production schedules. Klem has also developed many standard formulae for meeting tough, but not uncommon conditions.

Klem's business has grown on the strength of confidence in their ability to solve problems.

3 OF 20 STANDARD KLEM PRODUCTS

KLEM KOTE No. 240—A new and superior phosphate coating for metal surfaces, assuring better paint adhesion.

BOOTH KOTE No. 69 — Coating for dry spray booths—non-inflammable, non-flaking. Provides easy peeling off of accumulated paint.

RUST SOL No. 113 — An easy wipe-off process for cleansing and preparing steel for painting. Dissolves oil, soil, rust, etc. Neutralizes surface.

KLEM PRODUCT of the MONTH

STRIP-AID No. 176

Save 50%, add low percentage to your stripper — get fast one-step action. Save materials, labor, heat — salvage rejects, strip accumulated paint from hangers, dollies, at low cost. Write for details.

KLEM Chemicals Inc.
14401 LANSDOWNE DEARBORN, MICHIGAN

Industrial Ventilation Conference

The *Second Annual Industrial Ventilation Conference* will be held at the *Kellogg Center* on the *Michigan State College* campus February 16-19, 1953.

This school is co-sponsored by the School of Engineering, Michigan State College, and the Division of Industrial Health, Michigan Department of Health. It is devoted to the teaching of the practical application of exhaust systems for the control of industrial contaminants.

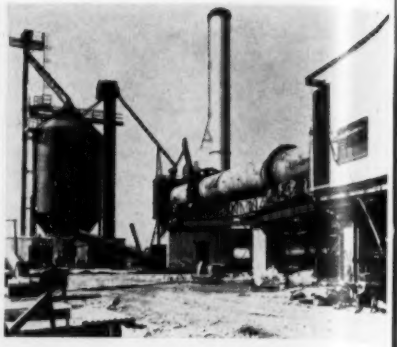
According to those attending last year, the outstanding feature of the Conference is the class room sessions. Those attending will have a choice of working out an elementary or advanced problem. These problems are worked out in small groups, each group aided by an experienced engineer acting as instructor.

There will also be talks and demonstrations by experienced field men on such subjects as duct design, fans, selecting air tempering units, etc.

International Graphite & Electrode Div. of Speer Carbon Installs New Equipment

In order to improve the quality and increase the supply of calcined coke for the production of graphitized carbon electrodes and other carbon products, the *International Graphite & Electrode Division* of *Speer Carbon Co.* has installed a rotary calciner at their Niagara Falls, N. Y., plant.

The coke calcined in the new equipment will be used in the manufacture of electrodes and anodes for the metallurgical and chemical industries as well as to supplement the supply of raw material used in the main plant of Speer Carbon Co. for motor brushes, electrodes, and other carbon specialties.



New Du Pont Appointments

Roland H. ("Major") Dufault, for the past 20 years manager of the New York district sales office of the *Du Pont Co.'s Electrochemicals Department*, retired on January 1, 1953, the company announced recently.

Succeeding him will be *Reynolds C. Cochrane*, who has been assistant manager of the New York office since 1949.

At the same time the company announced that *Victor B. Sarkissian*, vinyl products sales manager, will be transferred to New York as assistant district manager succeeding Mr. Cochrane.

Mr. Dufault began his career with Du Pont in 1919 as a salesman for acids and heavy chemicals, becoming Philadelphia branch manager in 1923. In 1930 he joined the Roessler & Hasslacher Chemical Company, acquired later that year by Du Pont, as manager of the Feldspar Department. A year later he became manager of the Du Pont Ceramics Division and, in 1932, was appointed manager of the New York district sales office.

Mr. Cochrane has been in sales work with Du Pont since 1933. He started as a clerk in the Philadelphia electrochemicals sales office and subsequently served as a salesman there and in the Charlotte, N. C., and Chicago district sales offices. He was sales manager of vinyl products in the Wilmington office prior to his appointment as assistant New York office manager three years ago.

Mr. Sarkissian started as a laboratory analyst at the Du Pont Niagara Falls, N. Y., electrochemicals plant in 1940. After two years as a chemist in solvents research there, he became a technical representative for solvents in the New York sales office and in

1946 was transferred to the Detroit office in a similar capacity. He came to Wilmington in 1950 as technical representative in the vinyl products division and was made sales manager for vinyl products in March of this year.

National Research Appoints Clough

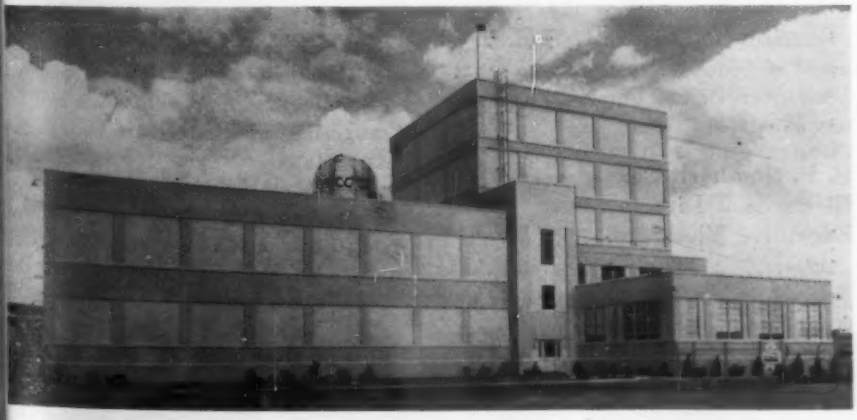
Robert A. Stauffer, Vice President in Charge of Research of *National Research Corp.*, announced the appointment of *Philip J. Clough* as Assistant Director of the Metallurgical Dept.

Mr. Clough has been employed by National Research Corp. since 1946 where he has been a project manager until the recent advancement. He received his B.S. from Bowdoin College, Brunswick, Me., in 1943, and his M.S. in chemistry at Middlebury College, Middlebury, Vt. Prior to his coming to National Research, he held posts as a teaching fellow in chemistry at Bowdoin, a graduate fellow at Middlebury, and a chemist at *Reynolds Metals Co.*

Mr. Clough is a member of *The Electrochemical Society*, the *American Ceramic Socety*, and the *National Association of Corrosion Engineers*. His activities at National Research have been concerned with the development of analytical processes for the determination of trace impurities in copper, the separation of metals by vacuum distillation, thermal and chemical reduction of metals, and the application of corrosion resistant coatings for high temperature use. He has also contributed to the development of processes for the metallic coating of heat sensitive materials.

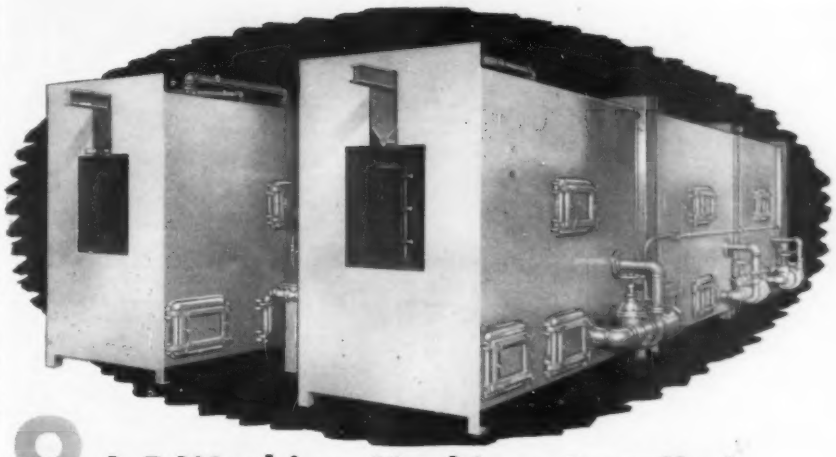
New West Coast Peroxygen Plant Now "On-Stream"

The new *Buffalo Electrochemical Co.* plant in Vancouver, Wash., constitutes the first major expansion in the country's hydrogen peroxide facilities during recent years. This new supply source is capable of filling all west coast requirements, making more of Becco's Buffalo production available for the eastern, southern and central states.



Hooker Appoints Moffitt

Thomas E. Moffitt has been appointed western manager of the *Hooker Electrochemical Co.*, it was announced. *Horace W. Hooker, Jr.*, has been appointed western sales manager, succeeding *Albert H. Hooker* who has



9 A-F Washing Machines Installed Because They Are JOB ENGINEERED!

You Can SEE The Superiority of A-F ENGINEERING

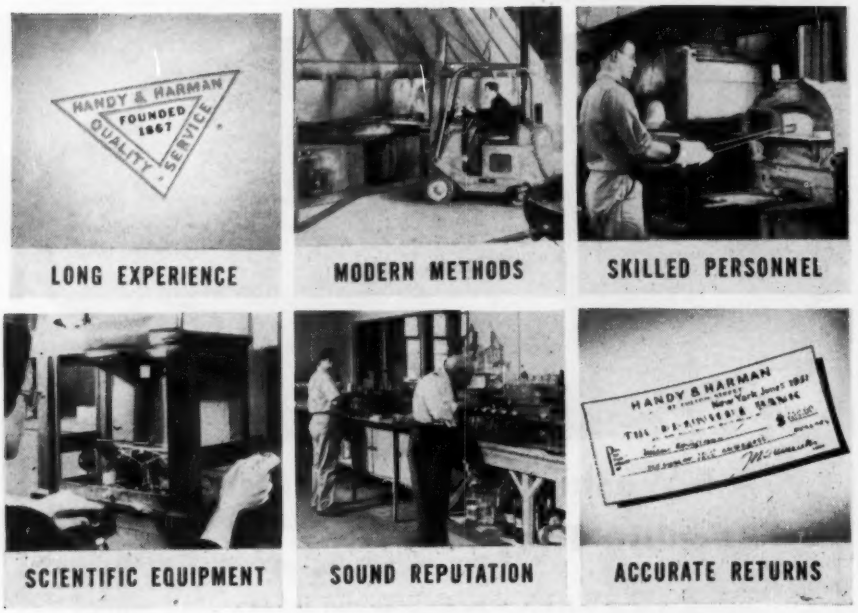
WHEN a large gear and forging plant wanted the fastest, most economical and efficient method of cleaning transmission housings and other metal parts, they decided upon Alvey-Ferguson *job-engineered* Washing Machines. Two machines in their battery of nine are shown above.

Leading plants everywhere are using A-F Washing Machines because each machine is *engineered for a particular job!* Many factors enter into the efficient performance of metal parts or products washing machines—the size and shape of the parts or products, kind of metal, sequence of cleaning or other operations involved. Because these factors vary widely, no one type of machine can do all these jobs adequately!

You can be certain that an A-F *job-engineered* Washing Machine will handle your work efficiently. Don't be satisfied with less! Write for a discussion of your metal parts or products cleaning problems—today!

THE ALVEY-FERGUSON COMPANY
200 Disney Street — Established 1901 — Cincinnati 9, Ohio
Offices or Representatives in Principal Cities—Coast to Coast

CONVEYING EQUIPMENT
Alvey-Ferguson
WASHING MACHINES FOR INDUSTRY



These 6 REFINING features
are all important to you!

■ If someone asked you which of these refining features meant most to you, it's dollars to doughnuts you'd say—*"Accurate returns—I want the full value from every shipment I make."* Well, you would be right—and you put your finger on the main reason why it will pay you to send your refinings regularly to Handy & Harman. You can get accurate returns only from a refiner who has *all* the features above. We have them — the result of long years devoted exclusively to the fabrication of precious metals and the refining of all forms of gold, silver and platinum scrap and waste. Through metallurgical research we have taken the guesswork out of refining and put it on a scientific basis. That's why we *can* and *do* make consistently accurate returns. Make a test with your next lot and compare service and returns.

Send your next shipment to our nearest plant

HANDY & HARMAN

WEST COAST: 3625 Medford St., Los Angeles 63, Calif.
CENTRAL U. S.: 1900 West Kinzie St., Chicago 22, Ill.
EAST COAST: 82 Fulton St., New York 38, N. Y.; 15 West 46th St., New York 36, N. Y.; Bridgeport 1, Conn.; 425 Richmond St., Providence 3, R. I.

taken an extended leave of absence on the advice of his physician.

Mr. Moffitt's appointment makes him senior executive for all Hooker affairs in the west coast area, including British Columbia, the announcement stated. He has been works manager of the Tacoma Plant since October 1951, and previously had served as assistant works manager, assistant sales manager, and as a chemical engineer. Mr. Moffitt originally joined Hooker in 1930 and served until 1945. He rejoined the organization in 1950.

Horace W. Hooker, Jr. has been associated with the organization since 1934 when he joined the research and development department.

Albert H. Hooker has been western sales manager of the company since the establishment of the Tacoma Plant in 1928 and has contributed greatly to the growth and development of the company, the announcement pointed out. He continues as a director of Hooker Chemicals Limited, a British Columbia corporation. This recently organized company has acquired 60 acres of industrial property in North Vancouver, British Columbia as a contemplated plant site.

B. F. Goodrich Elects Richardson Director, Executive Vice-Pres.

William S. Richardson, vice-president of *The B. F. Goodrich Co.,* has been elected a director of the company and also to the position of executive vice-president, it is announced by *John L. Collyer,* chairman of the board and president. Mr. Richardson also was elected a member of the executive committee of the board of directors.

Mr. Richardson joined the company in 1926 as manager of the planning department in Akron, Ohio. Two years later he became staff superintendent of the company's industrial products division and in 1931 was named merchandising manager of that division. In 1938 he was made division general sales manager and in 1941 became general manager of the industrial and general products sales division. He was elected president of *B. F. Goodrich Chemical Co.* on its organization in April 1945, and was elected vice-president of The B. F. Goodrich Co. in April 1951.

Mr. Richardson is a graduate of Technical High School, Boston, Mass. He is a veteran of World War I, and during World War II was chairman of the OPA Mechanical Rubber Goods Industry Advisory Committee.

He is a member of the board of directors of the Manufacturing Chemists Association and is presently vice-president of that organization.

Seven Papers for Chemical Industry Symposium at NACE Chicago Meeting Listed

Titles of seven papers scheduled to be delivered at the Conference at Chicago March 16-20, 1953 have been announced by *C. A. Coberly,* Mallinckrodt Chemical Works, St. Louis, Chemical Industry symposium chairman. The Chemical Industry Symposium is one of eleven scheduled for the meeting, to be held at Hotel Sherman.

The titles and names of the papers' authors are:

Use of All-Plastic Equipment and Piping in Technical Corrosion Protection, by *J. L. Huscher,* American Agile Corp.

Corrosion by Acids at High Temperatures by *R. F. Miller, R. S. Treseder* and *A. Wachter,* Shell Development Company.

Metallurgy of Corrosion by *F. Prange,* Phillips Petroleum Co.

Statistical Analysis of Corrosion Data by *O. D. Ellis,* Armco Steel Corp.

Corrosion Study in a Salt Plant by *H. B. Rickert,* Michigan Chemical Co. and *H. O. Teeple,* International Nickel Co.

The Behavior of Titanium in Sulfuric and Hydrochloric Acids by *G. C. Kiefer,* Allegheny Ludlum Steel Corp.

Beckman Names Bishop Assistant General Manager

Arnold O. Beckman announced the appointment today of *John F. Bishop* as assistant general manager, *Instrument Division, Beckman Instruments, Inc.*

Formerly head of Special Products Division, Bishop founded this department for Beckman one and a half years ago. He is a specialist in sales engineering and management. He received his Bachelor of Science degree at the University of California at Berkeley in 1945 and an M.B.A. Harvard, 1948.

Bishop is eminently qualified for this directorial position based on his years as engineering officer, Bureau of Ships, U.S.N., Washington, D. C. and in market research and sales engineering for Owens-Corning Fiberglas Corp., Los Angeles, Calif.

DeBothezat Appointments

DeBothezat Fans Division of *American Machine and Metals, Inc.*, announces the appointment of new representatives for the greater New York Area and northern New Jersey.

DeBothezat's complete line of industrial ventilating equipment will be handled in those areas by *Air, Dust and Fume Control Co.*, with offices at 50 Church St., New York City (phone Rector 2-6993) and Broad Street, Newark (phone Market 2-3008).

Royal Metal Mfg. Co. Acquires Conneaut Plating

Royal Metal Mfg. Co., one of the leading producers of chrome-plated metal furniture, steel shelving, and hospital and hotel furniture, has announced the acquisition of additional facilities in its continuing expansion program. The new acquisition of Royal Metal is *Conneaut Plating Industries*, Conneaut, O., and it will furnish plated parts for other Royal Metal factories, *H. A. Green*, president, announces.

Frank Rometti, plant manager at Conneaut for five years, will be general manager. Present manufacturing space totals about 10,000 square feet, with future expansion anticipated. When it reaches full production, the Conneaut plant will employ about 30 plating specialists.

In the Royal Metal system, each factory is assigned a major type of production. The Warren, Pa., plant, acquired in 1950, specializes in industrial and library shelving and room furniture for hospitals, hotels, dormitories, etc. The Walden, N. Y., plant specializes in assembly and light manufacturing, and now Conneaut will produce chromium and satin chromium plating.

In the past three years, in addition to the factories named, Royal purchased a new plant in Los Angeles and built another factory in Preston, Ont. At the main Royal factory in Michigan City, Ind., about 20,000 square feet is being added to the manufacturing space.

Chromic acid
purified and reclaimed by
ionXchange
PURE CHROMIC ACID can be recovered from your anodizing baths . . . plating and rinse water can be reclaimed and recirculated . . . easily, economically . . . with this newest ILLCO-WAY development. Standard and portable models.
Portable unit
. . . for treatment of several solutions located throughout plant; easily stored. Four standard sizes.
To provide pure water for make-up . . . a complete line of
"PACKAGE" DE-IONIZERS
. . . standard units for producing solids-free De-ionized water. (With a Chrome Purifier, tanks are never dumped, so pure water is more important than ever.)
Write for literature: Illinois Water Treatment Co., 856 Cedar St., Rockford, Illinois.
ILLCO-WAY

Fred W. Fraley Returns to Diamond Alkali

Fred W. Fraley, a vice-president of *Diamond Alkali Co.* who has been "on loan" to the U. S. Government, returned to Diamond from Washington on Dec. 15, it was announced at company headquarters here recently.

Mr. Fraley has been serving as Assistant Administrator in charge of the Chemical, Rubber and Forest Products Bureau of the National Production Authority, Department of Commerce.

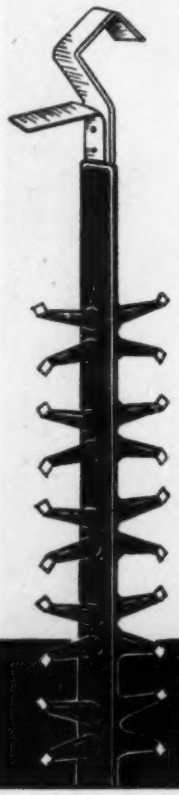
He joined NPA on March 31 as an assistant director of the chemical division under the rotation principle followed by NPA whereby industry executive are recruited to serve in key administrative positions for temporary periods.

In announcing Mr. Fraley's return, Diamond president *Raymond F. Evans* explained that Mr. Fraley's duties will involve special assignments, including relationships of the company with the government and the chemical industry as a whole.

NEW AND BETTER INSULATION

The improved BUNATOL Paste is perfectly adapted for use on plating racks and on many other forms of equipment where its use will save time, cost and rejects.

Plating racks insulated for every kind of service; for coating anode baskets; conveyor hooks; material handling equipment; grids; dipping baskets; fans and fan housings; acid pails; buss bar shields; and even for making castings in simple molds without pressure; are some of the everyday uses of the improved BUNATOL Paste No. 1002.



BUNATOL Paste made in Red or Black has all the new improvements in plastisol manufacture plus the famous one-coat BUNATOL Primer which provides that continuous and lasting adhesion which permanently binds the thick Paste coating to the object. Superior performance by any method of comparison. Provides the last word in low cost insulation with less time and labor cost.

No. 1002 heat curing Paste is an extremely tough leather-like material (of any desired thickness) that will withstand all electro plating chemicals such as strong and hot alkalies and acids, and the usual cleaning solutions. Oftentimes the insulation will outlast the plating rack. It's 100% solids so there is no loss from evaporation.

May we send you complete information about BUNATOL Paste? A note on your letterhead is all that is necessary.

NELSON J. QUINN COMPANY
TOLEDO 7, OHIO

Diamond Alkali Appointments

New assignments for two members of the *Diamond Alkali Co.* sales organization, *Justus U. Belville* and *Kemble S. Lewis*, have been announced by *W. H. McConnell*, director of sales.

Effective immediately, Mr. Belville becomes staff assistant to *J. C. Forsyth*, manager of alkali specialty sales at the company's general headquarters in Cleveland; and Mr. Lewis becomes assistant manager of Diamond's Chicago branch sales, the position formerly held by Mr. Belville.

To his new post in Cleveland, Mr. Belville brings a business background which includes experience in both the alkali specialty and general chemicals sales fields. A graduate of Colgate University, he joined Diamond in 1941, doing merchandising and specialty sales and service work in the Pittsburgh, Pa., area.

Following a term of naval service as an officer in World War II, Mr. Belville returned to his previous duties with Diamond in 1946. That year, following his transfer to the Chicago Branch Sales Office, he was engaged in handling sales of Diamond's general line of chemicals for industry.

In 1950, Mr. Belville was promoted to assistant manager of the sales office, which embraces Chicago and midwestern states, a post he held until his recent appointment to Cleveland.

Mr. Lewis has been associated with Diamond since 1947, when he joined the Chicago Branch Sales Office to do technical sales and advisory work on Diamond chemicals for the paint manufacturing industry.

A graduate of the University of Michigan with an M. S. degree in Industrial Engineering, Mr. Lewis is also a veteran of World War II, having served as an army officer with the Chemical Warfare Service and the O.S.S. from 1941 to 1946.

Prior to his recent appointment, Mr. Lewis had expanded his sales activities to cover Diamond's complete line of over 100 chemicals.

Altemus Represents Solvents Recovery Service in New England

Charles S. Altemus of Danbury, Conn., has been appointed New England sales representative for *Solvents Recovery Service, Inc.*, of Westfield, N. J., according to an announcement by *Carleton H. Boll*, vice-president and general manager. The company, which redistills all types of waste industrial solvents for reuse, has assigned Mr. Altemus to the New England territory which is serviced by their recently expanded Thomaston, Conn., plant.

Charles S. Altemus

Mr. Altemus' background includes eight years' experience with a well known manfacturer of lacquers and synthetics. During the war years he was chief chemist and production manager of this company. He has just finished an intensive training program in the Lofgren Process for refining waste industrial solvents.

Columbia Machinery Appoints Staubitz

William O. Staubitz has been named assistant sales manager of *Columbia Machinery and Engineering Corp.* of Hamilton, O., as announced by *Ken Troyer*, vice-president.

Mr. Staubitz was recently associated with *The General Electric Company* of Lockland, O., where he served for two years as machine tool coordinator with the sub-contract department of the Jet Engine Division. Long associated with many sports activities in this area, Mr. Staubitz, a native of Cincinnati, attended local schools, Pratt Institute, and Valparaiso University.

This appointment, another example of the current expansion program of Columbia, may be coupled with this corporation's recent acquisition of *The Bridgeport Grinder Co.* and *The Diamond Safety Emery Wheel Co.* of Bridgeport, Conn.

E. M. Ott Heads Pennsalt Sales Research Department

All statistical and analytical functions pertaining to marketing in the *Pennsylvania Salt Mfg. Co.* have been combined into a newly organized Sales Research Department, with *E. M. Ott* as manager, it was announced by *William P. Drake,* vice-president.

The new department will explore markets for new products under consideration in the Research and Development Division or the Sales Development Department and will conduct studies associated with existing markets and services. To make this work more effective, the Sales Analysis Department becomes a section of the new department.

Mr. Ott formerly was manager of the Security Analysis Department. The work of this department has been transferred to the office of the president. The new department manager, a graduate of Drexel Institute of Technology, joined Pennsalt in November, 1940, and has been engaged in market research and chemical engineering.

Smoothex, Inc., Completes New Building

Lloyd B. Portzer, president of *Smoothex, Inc.,* announces the completion of their new modern plant at 10705 Briggs Road, Cleveland 11, Ohio. *W. C. Leitenberger,* who has 13 years experience in the plating business is secretary-treasurer.

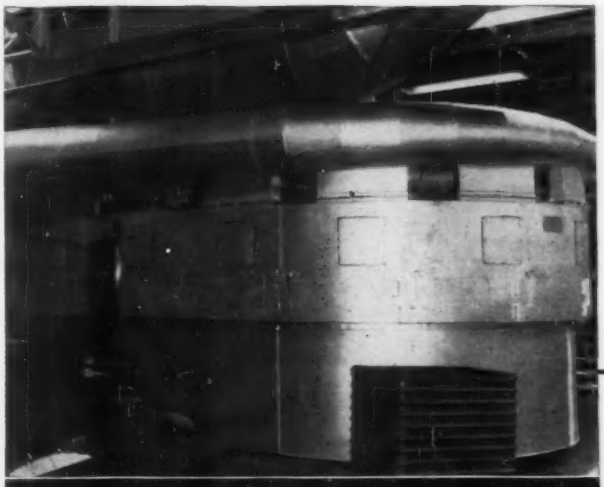
Mr. Portzer has years of specialized plating experience behind him. He is well-known in the plating field as having developed a method of plating heavy deposits of chromium on carbon.

The new building contains up-to-date offices, laboratory and plant. This expansion further increases their capacity for the efficient handling of customer orders for the Smoothex bright nickel process, a fast, low-cost bright nickel-plating method.

KIRK AND BLUM
FUME CONTROL SYSTEM
Saves 5 Ways..

1. REDUCES AIR VOLUME
2. LOWERS MAINTENANCE COSTS
3. CUTS REPLACEMENT COSTS
4. IMPROVES WORKING CONDITIONS
5. ELIMINATES DAMAGE TO OTHER EQUIPMENT

In large and small plants, Fume Control Systems engineered, fabricated and installed by KIRK & BLUM show substantial savings by increasing the life of costly plating equipment.
Here, a hood—with convenient access openings encircles the tanks — preventing cross currents and reducing air volume requirements.
Fumes are picked up at the outside of the tank, clean air is drawn over the machine's mechanism in the center, thereby keeping damaging corrosive fumes away from costly moving or mechanical parts.



KIRK & BLUM Fume Control on an Automatic Plating Machine in a noted auto ignition parts plant. Note hinged anode access and inspection doors just above tank top.

Write for Booklet F, showing typical installations.
The Kirk & Blum Mfg. Co.,
3159 Forrer Street,
Cincinnati 9, Ohio

National Lead to Acquire Doehler-Jarvis

A plan for the acquisition of the assets and business operations of *Doehler-Jarvis Corp.* by *National Lead Co.* was announced today by *Joseph A. Martino,* president of National Lead, and *F. J. Koegler,* president of Doehler- Jarvis. The business will be operated as a division of National Lead. The transaction, when final approval is given by Doehler-Jarvis stockholders, will result in the distribution to Doehler-Jarvis stockholders of National Lead common stock on the basis of 1.15 shares of National Lead common stock for one share of Doehler-Jarvis common stock.

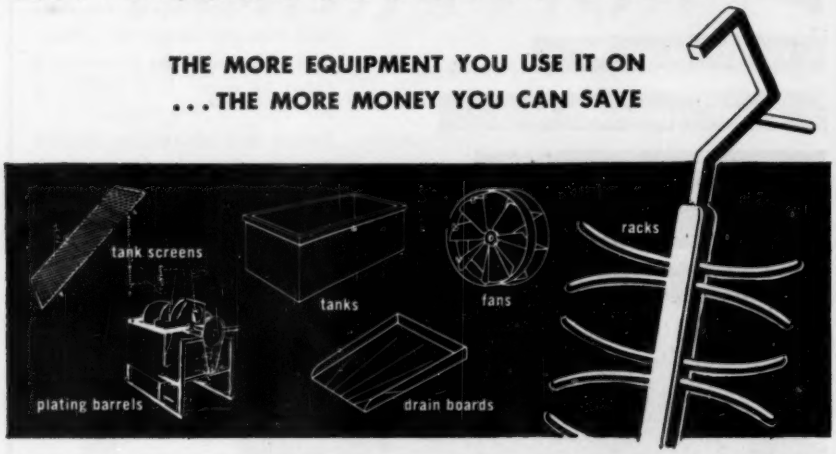
Doehler-Jarvis, a major producer and finisher of die castings, had sales last year of $85,861,763, with adjusted net earnings of $5,511,605. National Lead Company's sales for 1951 were $389,941,313, with earnings of $22,-993,717.

Doehler - Jarvis Corporations has plants at Grand Rapids, Michigan, Chicago, Ill., Toledo, O., Batavia, N. Y., and Pottstown, Pa. New plant facilities include a new die casting and electroplating plant and an armor plate production unit at Grand Rapids and a new die casting unit at Pottstown. It now has under construction the largest die casting machine ever built. This machine will produce aluminum castings weighing up to 75 pounds or zinc casting weighing up to 200 pounds.

Production for civilian use consists

Coating 218X protects all these...and more

THE MORE EQUIPMENT YOU USE IT ON
...THE MORE MONEY YOU CAN SAVE



It's getting to be the all purpose coating in plating plants – this green plastisol rack-coating. That's because there are so many pieces of equipment besides racks which have to combat corrosive conditions. They too need a coating with the flexibility, body, chemical inertness and toughness of Coating 218X.

Coating 218X withstands all plating, cleaning, anodizing solutions. Also vapor degreasing cycles. It absorbs bumps and abuse without chipping or damage. It's controllable in thickness from 3 mils to 3/16-inch.

So by all means protect racks with Coating 218X – you can't find a better way to reduce coating costs. But why not also take advantage of its durability *wherever* corrosion costs you money? Phone, write for help on applications.

UNICHROME Trade Mark **COATINGS for METALS**
Metallic . . . . . Organic . . . . . Decorative . . . . . Protective

Products of UNITED CHROMIUM, INCORPORATED

100 East 42nd St., New York 17, N.Y. • Detroit 20, Mich. • Waterbury 20, Conn. • Chicago 4, Ill.
Los Angeles 13, Calif. • In Canada: United Chromium Limited, Toronto, Ont.

of component parts for automobiles and trucks, household appliances, electrical equipment, office and factory equipment, oil burners, air conditioners and railroad equipment. For the military, Doehler-Jarvis supplies parts for military aircraft, tanks, ammunition, guided missiles, gun sights, combat vehicles and signal equipment. In addition, steel plates for tanks and other combat vehicles are now produced at the Grand Rapids plant.

Acquisition of Doehler-Jarvis will extend National Lead Company's operations in the die casting field. National Lead is a leading fabricator of nonferrous metals, and a large producer of titanium dioxide pigments, mixed paints and paint materials, railway journal bearings, oil well drilling materials and is a fifty per cent owner of Titanium Metals Corporation of America, the country's largest producer of titanium metal.

Magnus Chemical Stockholders Elect Officers

W. Montgomery Campbell of Westfield, N. J., was re-elected, for the 31st time, president and chairman of the board of directors of *Magnus Chemical Company, Inc.*, at the annual meeting of the stockholders.

These executive officers were also re-elected: *Robert W. Mitchell* of Westfield, vice-president—production; *David Blanchard*, Westfield, vice-president—sales; *William M. Garbe*, Scotch Plains, treasurer and *H. Y. Barrow*, Cranford, secretary.

Other newly elected officers are *David P. Blount*, vice-president—chemical sales; *William A. Mays*, vice-president and technical director; *John D. Holmes*, vice-president — marine and foreign operations, *Alexander W. Bowling, Jr.*, assistant secretary; *Miss Catherine M. Shea*, assistant treasurer and *Edward H. Peterson* assistant to the president.

David P. Blount

Among new directors elected for one year terms are: *Lonsdale Green, Jr.*, and *Frank J. Petura* of Westfield; *Herbert H. Klein* of New York City; *Sandy M. Campbell* of New York City and *Wesley A. Stanger, Jr.*, of Cranford.

Mr. Campbell has resided in Westfield since 1927. Before founding Magnus in 1921, he was assistant to the general manager of *Oakite Chemical Co.* and was associated with the Saturday Evening Post in the advertising department.

He is also president and chairman of the board of *Dif Corp.*, which he founded in 1925. He holds the same offices with *Larkin Soap Co.* and

William A. Mays

John D. Holmes

D.M.S., Inc., and is chairman of the board of *K. A. T.* of Garwood, all affiliated with Magnus.

Electroforms, Inc., Move to Larger Quarters

Electroforms, Inc., formerly *Super Matrix Co., Inc.* announce that they have recently moved into larger and more modern quarters, located at 1841 West Gage Ave., Los Angeles 47, Calif. Electroforms deals exclusively in the manufacturing of electroformed parts and have expanded their facilities to include all phases of the electroforming industry. President of the company is *Paul Silverstone*, well known chemical engineer.

OBITUARIES

JAMES J. MANDERSCHEID, SR.

James J. Manderscheid, Sr., president of *The Manderscheid Co.*, 810

James J. Manderscheid, Sr.

Fulton Street, Chicago 7, Ill., and an early pioneer in the polishing industry, died August 18, 1952 at the age of 62. He started the above company, which specializes in metal finishing equipment and supplies.

Mr. Manderscheid had served the polishing industry for the past 40 years.

Jimmy, as he was affectionately known, attended many of the *American Electroplaters' Society* conventions and had a host of friends in the industry.

Mr. Manderscheid is survived by his widow Pauline, two sons James and Harold, a daughter Mrs. Lillian Krause, and two grandchildren.

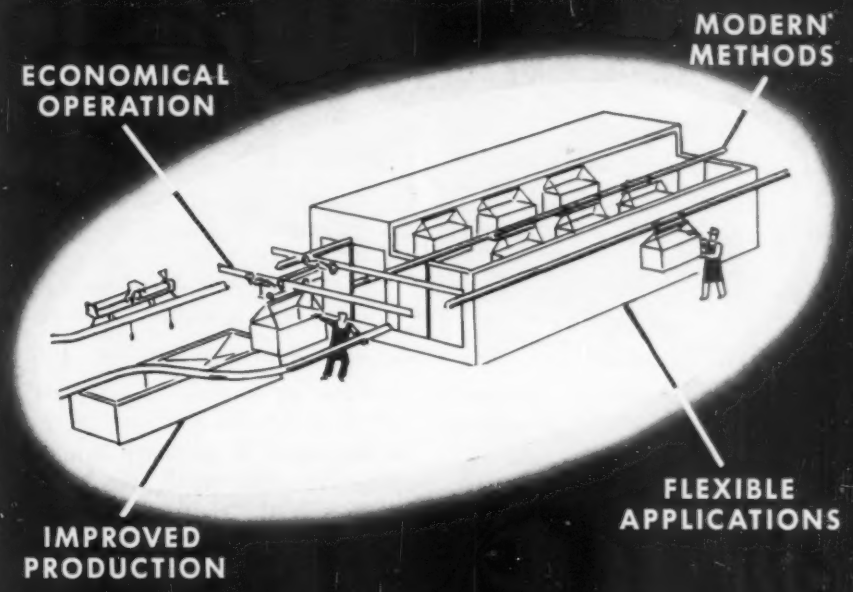
ALFRED M. JONES

Speer Carbon Company regrets to announce the death of *Alfred M. Jones*, Midwest sales representative for International Graphite & Electrode Division.

Mr. Jones who had been with the company since 1934, died of a heart attack in Milwaukee, Wis., December 8, 1952.

WHY INDUSTRY CHOOSES

MORRISON FINISHING SYSTEMS



Morrison Complete Finishing systems are designed to meet the everyday work requirements of American industry. Morrison built units have many advantages and *EXTRA* features not found in ordinary equipment. Where quick changes and production schedules are required the flexibility of Morrison units is readily adaptable to all types of products. In one loading operation the Morrison Finishing System cleans, paints and bakes, either for short or long runs.

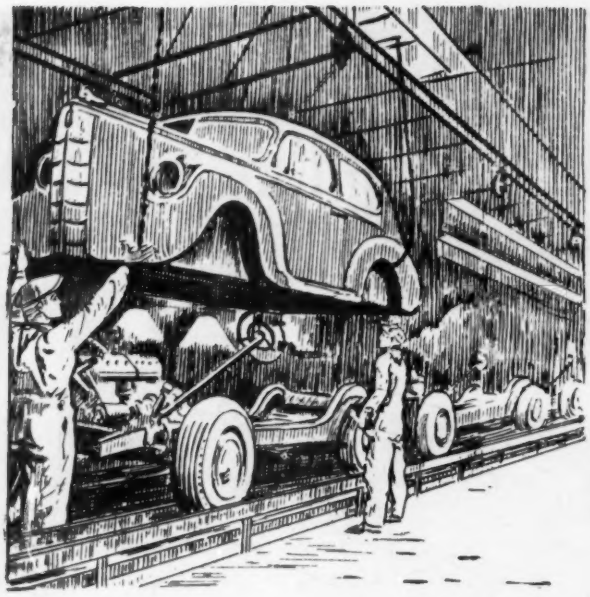
Morrison is the choice of the metal industry for better and more efficient operations.

A Morrison specialist is as near as your telephone — Call **TYler 1-2222.** Quotations can be made immediately.

MORRISON ENGINEERING CORPORATION

2222 FAIRHILL ROAD, CLEVELAND 6, OHIO

DESIGNERS AND BUILDERS OF INDUSTRIAL FURNACES AND OVENS



MOTOR CITY PLATING NEWS

by

Edward Finne

Michigan Chrome Announces Changes

The *Michigan Chrome & Chemical Co.*, Chemical Division, Detroit, announces the retirement of *George H. Russ*, sales manager, due to ill health.

Mr. Russ is presently living near Grand Rapids, Mich., and his many friends in the electroplating industry throughout the country wish him the best of everything for the future.

King Ruhly, formerly Assistant Sales Manager, has been appointed Sales Manager. Mr. Ruhly represented Michigan Chrome in the Chicago area for five years prior to his assuming new duties in the home office last March.

He will now direct sales and advertising of the products manufactured by the company.

BETTER COMPOUNDS *mean* MORE PRODUCTION *and* INCREASED PROFITS

Thirty years of experience developing and furnishing Polishing and Buffing Compounds to the Automobile Industry and hundreds of allied metalworking firms entitles us to solicit the opportunity of working on your polishing and buffing problems. Write us today.

C. H. McAleer, President.

Detroit Chemical Specialties Inc.

101 S. Waterman • Detroit 17, Mich.

SMOOTHEX *"lightning"* BRIGHTENERS

SWITCH TO SMOOTHEX BRIGHT NICKEL PROCESS! Saves time and dollars daily! *SPEEDS UP* PLATING ACTION! SMOOTHEX Brighteners in a standard Watts formula result in unsurpassed Nickel brilliance instantly occurring at the beginning of the plating cycle — lustre intensity increases until maximum brightness is reached! No period of dullness! Flaws, lines, irregularities in material disappear because SMOOTHEX is unexcelled in line filling properties. Ease of control is assured. Only SMOOTHEX gives you top quality plating jobs at LOWER COST! You can convert easily, at little cost, to SMOOTHEX BRIGHT NICKEL PROCESS. Send us a sample of your solution for conversion instructions.

SMOOTHEX, INC.

10705 BRIGGS ROAD CLEVELAND 11, OHIO

King Ruhly

Frank Jones has been promoted to Assistant Sales Manager of the company. He represented Michigan Chrome in the New England area for five years prior to his appointment.

Mr. Jones will concentrate his efforts as Assistant Sales Manager on the establishment of new channels of sales and new products in the vinyl plastisol field.

These gentlemen have played a prominent role in the development and sales of a compleet line of rack coatings, stop-off materials and corrosion resistant coatings, known as Miccrosol and Miccro Products, for the electroplating industry. These efforts have resulted in establishing Michigan Chrome as one of the leaders in this field.

Frank Jones

Du Pont Appoints Hansen

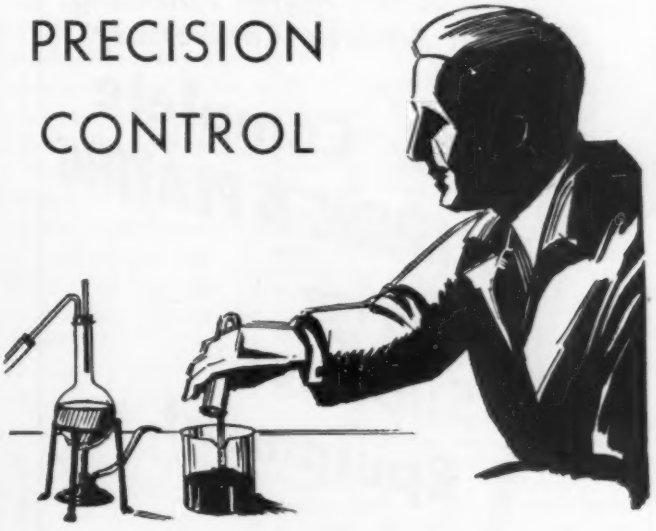
Harry I. Hansen has been appointed manager of the Detroit district sales office of the *Du Pont Company's Electrochemicals Department* succeeding *Morell Marean*, the company announced today.

Mr. Hansen has been in sales work with Du Pont since 1937 and for the past nine years has been a salesman in the Chicago area. He started with the company in 1934 as an operator at the electroplating laboratory of the Grasselli Chemicals Department in Cleveland and three years later was made a technical service representative for the metals, ore, and plating division. When the activity of that group was consolidated with the Electrochemicals Department, he continued as an electroplating service man in the Chicago territory, and, in 1943, became a salesman representing all of the department's products.

A native of Cleveland, Mr. Hansen attended the University of Wisconsin where he played on the varsity football team and was graduated with a B.S. degree in 1930.

Mr. Marean, who is going into other work, has held several positions in the Electrochemicals Department and has been Detroit district manager.

PRECISION CONTROL



ANOTHER FIRST BY

PILLSBURY CHEMICALS

THE NEW CATHANODE

A HEAVY DUTY ELECTROLYTIC CLEANER FOR THE SURFACE PREPARATION OF STEEL BEFORE ZINC, CADMIUM OR COPPER.

Complete Line of

Preplating Cleaners, Rustproofings and Stamping Compounds

PILLSBURY CHEMICALS

6545 GEORGIA AVE. DETROIT, MICH.

Walnut 5-4141

Malajan Joins Udylite as Sales Engineer

John C. Malajan

John C. Malajan has joined the Detroit sales office of the *Udylite Corp.* as sales engineer for the Michigan area. He has recently completed a comprehensive technical training course at the Detroit office.

Malajan is a native Detroiter. He was graduated from Albion College with a B.S. degree in chemistry. Following graduation he spent 18 months as a chemist with the U. S. Army, serving in the Pacific Theater.

Prior to joining Udylite, Malajan was associated with the Timken-Detroit Axle Company and Standard Oil of Indiana.

Wagner Brothers Retain Tebben Company

Wagner Brothers, Inc., manufacturers and distributors of plating supplies and equipment, have retained *John D. Tebben & Co.*, Birmingham, Mich. management consulting firm, with a view toward strengthening their sales organization. A complete survey of the markets for the various products manufactured and distributed by the company is being conducted under personal direction of *John D. Tebben.* Expansion and alteration of the present distribution and warehousing facilities and methods are now in process, according to *O. H. Tiedeman*, vice president in charge of sales.

Mr. Tebben pointed to rapidly changing political and economic conditions as a signal for industry to analyze sales and advertising programs in preparation for a period of competitive business. Mr. Tebben has been collaborating with metal-working industries for many years and is active in American Welding Society, Society of Automotive Engineers, Engineering Society of Detroit and others; the Tebben Company has re-vitalized sales organizations for a number of manufacturers in Michigan and elsewhere.

John D. Tebben

Congratulations Metal Finishing
On Your Fiftieth Anniversary

or Complete
POLISHING & PLATING
Service
Supplies
Epuipment

CROWN FULL AUTOMATICS
BRIGHT FINISHER • RHEOSTATS
RECTIFIERS
BUFFS • BUFF LATHES
AUTOMATIC BUFFERS
LEA GREASELESS • GRAVIFLOW
TUMBLING BARRELS AND PROCESS
UNICHROME • UCILON
SEYMOUR BRIGHT NICKEL
PROMETHUS COLD NICKEL
PLATING RACKS

W. M. Fotheringham
975-81 NIAGARA ST., BUFFALO 13, N. Y.

Easy to Apply
RUBBERITE
TANK LINING

Just heat
to 300°F
and pour

Provides a lasting lining that withstands acids and caustics at room temperatures. A standby of Platers for over 25 years. Effectively protects wood or steel tanks. Easily applied in your own shop—just turn tank on side and fasten board on edge as illustrated. Then heat Belke Rubberite to 300° F. and pour over surface. Surfaces to be coated require no special preparation but should be reasonably clean.

When Rubberite cools, it has characteristics similar to soft rubber. Will not crack, scale, or run in the hottest weather. Write for complete information.

Belke MANUFACTURING CO.
947 North Cicero Ave.
Chicago 51, Ill.
EVERYTHING FOR PLATING PLANTS

ALL PLASTIC PLATING TANKS are not PLA-TANK®

and They're Not All Alike!

Naturally we've had imitators. Every good idea has. We're proud that PLA-TANK is the pioneer name in the resin-bonded Fiberglas® tank field and hundreds upon hundreds of our customers are happy with the service they're getting from their PLA-TANK products.

Occasionally some one succumbs to the lure of a lower price or a glossy paint job or a smoother finish and passes up PLA-TANK'S superior features. When they have a failure they condemn plastic tanks as a whole.

Before buying any plastic tank, CHECK THESE PLA-TANK FEATURES

Every unit is made individually by custom layup molding. This personal attention to each square inch of surface is the only way to guard against weakening dry spots and brittle resin buildups.

Translucent material insures against possibility of hidden flaws. Every particle of PLA-TANK is like every other particle — same resistance inside and out, all the way through. No surface coats or paints to cover defects.

Tanks are built to basic hydraulic principles of design. Reinforcing ribs are horizontal to prevent deflection. Corners are built up triple, edges double for added strength and longer service.

Over 150 standard sizes in rectangular and cylindrical tanks are available. Write for size, price and data sheets.

THE Chemical CORPORATION

58 Waltham Ave., Springfield 9, Mass.

R. A. Lindsay, formerly section head in organic chemical sales at the *Dow Chemical Co.*, has been promoted to a new position in the Technical Service and Development department, *Donald Williams*, director of sales, announces.

Lindsay will be responsible for the development of chemicals for heavy soap and solvent cleaning industries.

****

The Detroit section of *The Electrochemical Society* held a dinner meeting at Wayne University on Friday, Nov. 21st.

To this meeting were invited the members of the Detroit branch of the AES and the contingent of platers produced a very respectable attendance. The attraction that drew the many platers was the guest speaker, *Richard S. Atwood*, Research Chemist of the *Bersworth Chemical Co.* of Framingham, Mass.

Mr. Atwood talked on the use of chelating agents in cleaning and electroplating processes and described his experimental work in using the chelating agents.

Many in the Detroit area have been doing experimental work with the chelating agents and, as was expected, the question and answer period at the end of the lecture produced a good many interesting and intriguing answers. We are sure that Mr. Atwood went back to Massachusetts with a great deal of unanswered questions after his brave appearance before the platers who sort of threw the book at him. We must say, though, that Mr. Atwood held his audience well and came off very well in the question and answer duel. The use of chelating compounds looks and has proved interesting to many platers. It seems to be a field well worth exploring.

****

The Detroit branch of the AES held its annual technical session on Friday evening, Dec. 5th, at the Statler Hotel.

Presented on the program were the following:

B. C. Case, manager of Research and Development of the *Hanson-Van Winkle-Munning Co.*, who talked on "Engineering Materials for Plating Room Equipment."

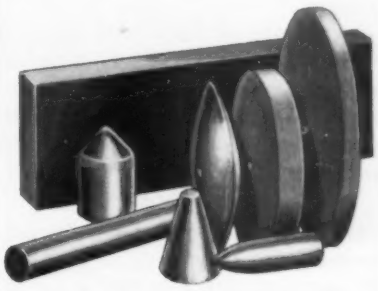
Don Foulke, Executive Secretary of the AES, who talked on "The National Society."

R. G. Chollar, Director of Research of the *National Cash Register Co.* and chairman of the Metal Finishing Industry Action Committee of the Ohio

Simplify Your BURRING, SMOOTHING and POLISHING operations

CRATEX RUBBERIZED ABRASIVES

"cushioned action performance"



Today's changing manufacturing picture — new production methods, new metals, increased use of plastics, new finishes, the rise in labor and material costs — all of these factors deserve the consideration and use of Cratex Rubberized abrasives for:

BURRING • SMOOTHING • POLISHING
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FIRM _____

INDIVIDUAL _____

STREET _____

CITY _____ ZONE _____ STATE _____

River Valley Water Sanitation Commission, who talked on plating waste disposal.

The first part of a colored movie entitled "The Nature of Corrosion, Anode and Cathode Processes." This movie was prepared by the *International Nickel Co.*

Franklin J. MacStoker of the Farrand Optical Co. and Supreme President of the AES, presided as honorary chairman.

The meeting was very well attended and because of the sobriety of the situation, it once more reflects on the wisdom of those who divorced the technical session from the Christmas party.

****

The Christmas party annually presented by the Detroit Branch of the AES was held at the Statler Hotel on the 6th of December.

Again this event drew a tremendous crowd estimated at over 1,500 men and women. All in attendance partook of the usual excellent Statler dinner, the women received a beautiful pin and earring set as a remembrance of the evening, and all enjoyed the fine entertainment presented in two sections in each of the Statler ballrooms. Dancing followed the entertainment.

The main complaint seems to be that there are not enough elevators in the Statler to provide transportation to and from the various hospitality rooms located far above the ballroom floor.

Howard J. McAleer, chairman of the party and his many faithful and hard working helpers, deserve a great hand for another great party.

Manufacturers' Literature

Liquid Coolers

Admiral Engineering Co., Inc., Dept. MF, 902 W. Erie St., Chicago 22, Ill.

The above firm has issued a booklet describing their custom packaged liquid coolers which are especially designed for many difficult applications where space or access is a problem. The booklet also has information on their compressors, motors, evaporators, condensers, heat exchangers and pumps. Further information will be supplied upon request.

Wagner Bros. Issue New House Organ

Wagner Brothers, Inc., Dept. MF, 427 Midland Ave., Detroit 3, Mich.

A new, interesting and informative six page bulletin 8½ x 11 inches, printed in two colors is being issued every month by the above manufacturers of plating supplies and equipment. The bulletin, "*Wagner Price-Tips*" contains price information on all plating and polishing supplies and standard equipment distributed by the company, and news of recent developments in the plating industry. The data is timely and of interest to all platingmen.

Copies may be obtained by writing the above company.

Portable Lucite Plating Barrel

Geo. A. Stutz Mfg. Co., Dept. MF, 1639-47 Carroll Ave., Chicago 12, Ill.

The above firm has published a new illustrated folder describing its new lucite barrel which is said to provide continuous processing of piece parts through the operations of alkali cleaning, water rinsing, acid treatment and plating. It is made in two sizes with

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Your sample parts processed without cost or obligation, furnish cycle time, cost and materials best suited for your jobs.

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cylinders having inside dimensions of 6" x 12" and 8" x 18". Standard perforations are 3/32", but smaller or larger openings can be furnished as required. All gears are of ½" high temperature lucite, gear bearings are permanently lubricated and it has an operating temperature of up to 185°F.

Copies are available by writing to the above address.

Hook-On Instruments

General Electric Co., Dept. MF, Schenectady 5, N. Y.

A new 8-page booklet describing General Electric's complete line of hook-on instruments has been announced as available from the company.

Designated GEC-901, the two-color bulletin contains applications, operation, and basic features of the G-E hook-on type AK-1A volt-ammeter; AK-2 wattmeter; and AK-3 power factor meter.

Electroforming Difficult Shapes

International Nickel Co., Inc., Dept. MF, 67 Wall St., New York 5, N. Y.

Describes the process. Details 12 applications that suggest other possibilities in joining, eliminating costly machining, making complex accurate shapes, forming dies, bonding abrasives, reproducing detail and making continuous fine mesh screens. Advantages are shown to apply to such diverse extremes as production runs of pen caps and seventy pound motor mounts. Physical properties, plating solutions and operating conditions are given for copper, iron, soft, medium and hard nickel deposits.

Electric Heaters

Edwin L. Wiegand Co., Dept. MF, 7627 Thomas Blvd., Pittsburgh 8, Pa.

Chromalox electric comfort heaters of every type, size and rating are described and illustrated in a new 8-page catalog, D-52. A quick selector chart shows how to calculate heat requirements for given areas and types of building construction.

The catalog lists 75 different models of forced air, convection and radiant heaters in capacities of ¼ to 100 kilowatts. In this wide selection are heaters suitable for heating anything from a small office to a complete building, while the radiant comfort heaters shown can be used for keeping men warm in open, or semi-exposed areas, such as shipping docks, box cars and the like where any other heat is ineffective. Many units have built-in thermostats; suitable controls for others, and how to choose them, are described in the new catalog.

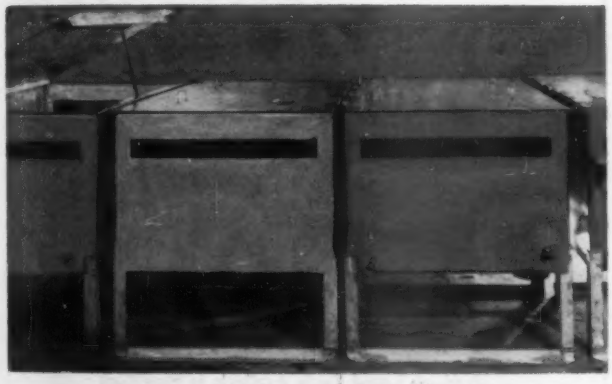
New "3M" Bulletin

Minnesota Mining and Manufacturing Co., Dept. MF, 411 Piquette Ave., Detroit 2, Mich.

Up-to-date uses for "3M" adhesives, coatings and sealers in industry, are shown in a new booklet announced this month by Minnesota Mining and Manufacturing Co.'s Adhesives and Coatings division in Detroit.

The 8-page booklet, available on request, describes and pictures 25 various industry-wide uses for the material. It shows, for example, adhesives for holding plywood to metal, rubber to metal, and vinyl to wood; coatings for anti-corrosion protection, smoothness and safety; and sealers for fuel tanks, auto windshields, and aircraft canopies.

In addition, the booklet describes and lists complete technical informa-



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Cap. 850 gal/hr
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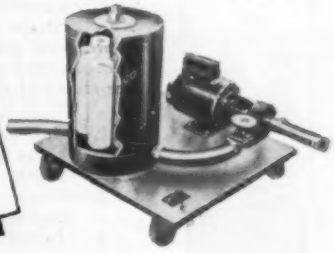
Portable, Wt. 150 lb.
2'x2'x2'



- Filter solutions from pH 0 to pH 14.
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tion on 26 of the firm's chief adhesive, coating and sealer products.

Temperature-Humidity Test Chambers

Tenney Engineering, Inc., Dept. MF, 26 Avenue B, Newark 5, N. J.

The above firm announces a new two-color four-page bulletin "TR" on its standard line of temperature-humidity test chambers. Chambers covered in this bulletin can simulate temperatures from −100°F. to +200°F. and relative humidities from 20 to 95%.

Specifications give data on heaters, humidification, de-humidification, temperature and humidity controllers, compressor equipment, insulation, exterior construction, access door, air circulation, standard equipment, and optional equipment. Chamber construction information, performance characteristics and typical applications also are included in the bulletin.

Interior dimensions and temperature ranges for eight different standard model types are tabularized in a specification section. Included also are 5 pictures showing typical chambers and chamber applications.

Air Dehydrators

Selas Corp. of America, Dept. MF, Philadelphia 34, Pa.

The continuous removal of water vapor from air and other gases, to dew points as low as 100°F., is described in a new bulletin pertaining to dehydration equipment. "Selas Dehydrators," a 12-page bulletin, describes the needs for dehydration and the extent to which gas or air can be dried, practicably, together with the operation of specified equipment.

Three series of dehydrators are fully specified as to capacities and physical dimensions. A nomograph is provided for preliminary determinations of appropriate equipment. A separate data sheet with spaces for more specific operating information is included for mailing to the manufacturer so that more precise equipment recommendations can be made. This bulletin is available upon request.

Gas Burner Bulletin

Hauck Manufacturing Co., Dept. MF, 124 Tenth St., Brooklyn 15, N. Y.

A new catalog just off the press, is No. 806. It describes the company's latest improved type and sizes of high pressure gas-air inspirators and boosters for industrial furnaces, ovens, kilns, driers, etc.

The major features of the new design are: maximum entrainment, streamlined flow and better control of induced air and an easily adjustable air shutter with a fiber pad under the locking thumbscrew. Dirt in atmosphere has less affect on the shutter and less space is required for a more compact installation.

The catalog will be sent on request.

Booklet on Diamond Finishing

Elgin National Watch Co., Dept. MF, Elgin, Ill.

The Abrasives Division of the above company has announced the availability of a new 8 page booklet on the efficient application of diamond abrasives. The new booklet contains basic information on the characteristics of diamond as an abrasive together with complete catalog data on Elgin Diamond Abrasive, DYMO, and the DYMO Finishing accessory line.

Outstanding feature of the booklet is actual illustration and detailed explanation of the primary applications of diamond for finishing—drawing die

Electro-Cupralum Anodes

FOR CHROME PLATING

A NEW AND REVOLUTIONARY DEVELOPMENT

Electro-Cupralum Anodes are manufactured by combining copper and lead through a Homogeneous Extrusion Process whereby the two metals are chemically and inseparably bonded together.

The resultant product consists of a full width *continuous* copper electrode with a Homogeneous lead covering on all sides except the underside of the copper hook.

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3. Even distribution of current through solution.
4. Permanently rigid.
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6. No build-up of temperature.
7. Periodic cleaning unnecessary.

Electro-Cupralum Anodes are *superior* because they combine the *superior* conductivity of copper with the *superior* protection of lead.

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polishing, plastic mold finishing, cutting tool edge finishing and mass-production polishing of component parts.

Surfactant Catalog

Onyx Oil & Chemical Co., Dept. MF, 190 Warren St., Jersey City 2, N. J.

The Industrial Division of the company has just issued a catalog on their outstanding surface active agents. This publication lists anionic, cationic and non-ionic agents and supplies data on physical and chemical properties, concentrations, general applications and specific suggested uses.

It should prove interesting and useful to any company planning new products or working on the improvement of existing products wherever wetting, foaming, dispersing, emulsifying, penetrating or detergent action are of value.

Tachometer Bulletin

The Bristol Co., Dept. MF, Waterbury 20, Conn.

A new bulletin describing its full line of recording and indicating electric tachometers has just been published by the above company. The instruments described include models for measuring speed of rotation or travel, processing time, speed ratios, sum or difference of speeds, and average of speeds. Featured in the bulletin are the recently-announced electronic Dynamaster recording tachometers. Engineering information and complete specifications on magnetos and the various types of magneto drives are given. The 20-page bulletin, No. S1402 is liberally illustrated with photos and drawings showing methods of application, reproductions of actual chart records, and dimensions.

Heat-Resistant Gloves

Mine Safety Appliances Co., Dept. MF, Braddock, Thomas and Meade St., Pittsburgh 8, Pa.

All-leather heat-resistant gloves, said to be able to "take" temperatures up to 800°F., are described and pictured in a new bulletin offered by the distributor. Models featured in the bulletin are 113G for temperatures up to 500°F., 213G with reinforced preshrunk palm up to 800°F., extra-long (13-inch) models, and outseam reversible mitts of similar construction. Details, including prices, are contained in the bulletin, available without charge or other obligation.

Booklet Illustrates Line Of Small "Standard Units"

Pangborn Corporation, Dept. MF, Hagerstown, Md.

New pocket-size two-color booklet put out by Pangborn, illustrates the company's line of small "standard units" for blast cleaning and dust collection applications.

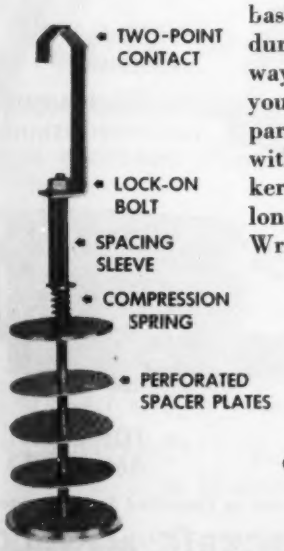
This unique booklet has two front covers. One cover opens onto blast cleaning pages. Turning the booklet upside-down puts the cover of the second section — devoted to dust collection — in proper reading position. Each section lists significant industrial applications, recommends the proper equipment for each, and illustrates the various models of Pangborn equipment.

Maintenance Costs

R. S. Aries & Associates, Dept. MF, 400 Madison Ave., New York 17, N. Y.

The above consulting firm of chemical engineers and economists has released a new brochure entitled "The

Anodize
DIFFERENT SMALL PARTS
AT THE SAME TIME



Perforated spacer plates in the Nankervis anodizing basket separate each batch during processing. That way, you save time because you can anodize different parts at the same time and without mixing. And Nankervis baskets are built for long years of service, too! Write for Bulletin C-2.

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METAL FINISHING EQUIPMENT
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You can count on something extra

When you get pickling equipment made of Monel®, you really get the works.
Here's what you can count on:

1. Excellent resistance to most acids.
2. High strength, which permits lighter fixtures.
3. Good weldability and workability which makes possible any required design.
4. Long service life — and wrought Monel equipment can be repaired for additional service life.

Consult your Distributor of Inco Nickel Alloys for the latest information on their availability from warehouse and mill. Remember, too — it always helps to anticipate your requirements well in advance.

For an informative booklet, write today for your free copy of "Where Monel Pays Its Way in Pickling."

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street, New York 5, N. Y.

Monel PICKLING EQUIPMENT extra life extra capacity extra safety

Problem of Maintenance Costs" by *Jackson D. Leonard*, senior associate of the company. Mr. Leonard is a specialist in cost reduction programs, and this new pamphlet discusses the profits lost through poor and inefficient maintenance practices, and what companies can do to improve performance in this department. His work represents a modern approach to reduction of maintenance costs for the chemical process industries. This brochure is available free upon request.

Optical Instruments For Quality Control

Bausch & Lomb Optical Co., Dept. MF, 650 St. Paul St., Rochester 2, N. Y.

Functions and general applications of seven types of optical instruments that aid production and quality control in industry are described in a new brochure.

The eight-page booklet is illustrated with photographs, drawings, and technical data. It describes the use of contour measuring projectors, stereomicroscopes, toolmaker's microscopes, thickness gages, and other optical instruments that may be used as separate units or built into present equipment for rapid inspection and measurement of a multitude of tooling and production items.

Maintenance Painting Guide

The Wilbur & Williams Co., Dept. MF, 130 Lincoln St., Boston (Brighton) 35, Mass.

A quick reference index maintenance painting guide in the form of a compact four-page folder is available to maintenance superintendents and engineers.

Concisely given are maintenance problems of industry and the answer for them listed such as the painting of metal for rust control, painting without odor, protecting concrete floors and walls, protection against chemicals and corrosion. How to cut maintenance costs through the use of paint coatings designed for the purpose is clearly outlined.

New "Electric Eye" Bulletin

Ess Instrument Co., Dept. MF, 96 S. Washington Ave., Bergenfield, N. J.

A new bulletin, No. 522, describing the wide range of application of "electric eyes" directly to process industries is now available. The bulletin, by means of problem and solution, covers some usual and unusual installations that have been made for instant and accurate monitoring of process flows. The bulletin points up techniques used for either gases or liquids and describes standard and special instruments. Also includes drawings of sample tank and look boxes.

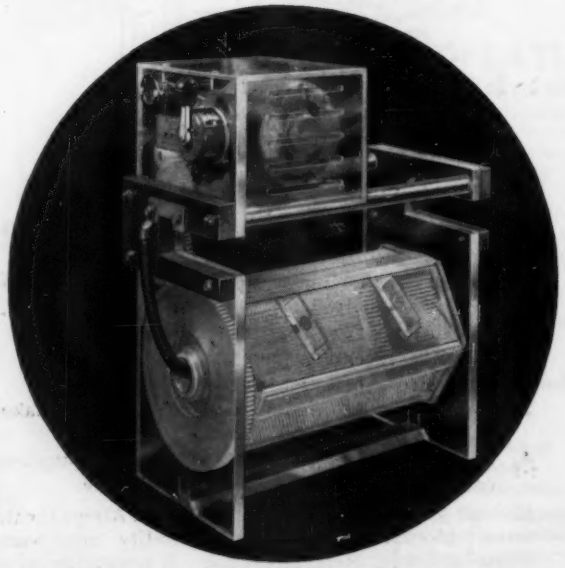
Mirra-Lap Folder

J. K. Smit & Sons, Inc., Dept. MF, Murray Hill, N. J.

The manufacturers announce the release of a new seven-color brochure dealing with the company's diamond lapping compound, "Mirra-Lap."

The brochure is geared to answer all questions pertaining to the applications, advantages and cost of this product. Photographs show clearly how and where to use Mirra-Lap. For further clarification a table is included showing the variety of grades, in their actual color, prices, and individual uses for each grade. Illustrations of applicators and tubes are also included.

It's NEW!



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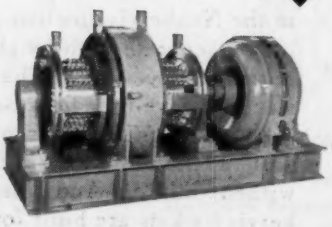

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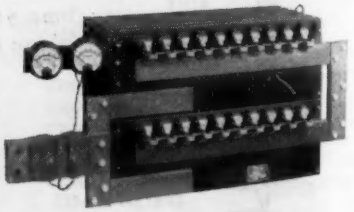

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Solvent Data Sheets

John B. Moore Corp., Dept. MF, P.O. Box No. 3, Nutley 10, N. J.

Of interest to safety engineers, industrial hygienists and maintenance men are the new, comprehensive data sheets now offered by the above company. Page C-1, in particular, discusses Halogen Solvent Toxicity and presents the 'safety quotient' method of rating relatively the toxicity hazard of solvents. Sheets 1, 2 and 3 describe clearly the usefulness, safety features and specifications of three of the company's products, Orthosene, Per-Trolene and Frigisol. These data sheets may be secured from the manufacturer by request on Company Letterhead.

Industrial Hose Assemblies

J. N. Fauver Co., Inc., Dept. MF, 49 West Hancock Ave., Detroit 1, Mich.

A 24-page catalog describing and giving complete specifications of Fauver industrial hose assemblies, couplings, stems, swivels and accessories, has recently been released by this firm. Fauver offers a line of hose covering a broad field of industrial applications. It is specially designed for intermediate and very high pressure, for ordinary and elevated temperatures, for excessive flexing and rough handling. Solvents, lubricants, plastics — many "difficult" materials are successfully handled.

Electrodeposition of Nickel

International Nickel Co., Inc., Dept. MF, 67 Wall St., New York 5, N. Y.

Electrodeposition of nickel at high current density—16 pages with tables and chart. Describes plating with all-chloride nickel and Watts-type baths at 160°F. at current densities up to 4260 amperes per square foot. Sound deposits were made by speeding up the flow of electrolyte over the cathode surface as the current density was raised.

Gram-atic Booklet

Fisher Scientific Co., Dept. MF, 717 Forbes St., Pittsburgh 19, Pa.

This 8-page booklet describes the direct-reading, single,pan Gram-atic balance, which eliminates all handling of weights, gives readings in 20 seconds. Weights are removed, not added, hence beam load—and sensitivity—is always constant. Booklet also outlines 6-step weighing procedure, lists balance specifications.

Associations and Societies

AMERICAN ELECTROPLATERS' SOCIETY

Philadelphia Branch

The following are abstracts of papers presented at the Annual Educational Session held by the Philadelphia Branch, November 22.

Dr. R. B. Saltonstall, Udylite Corp., spoke on "*Nickel Plating—Today and Tomorrow.*" The current shortage of nickel is due to the large amounts required for alloys used in jet engines. Today, 25% of the nickel used in plating has military applications, such as lining vessels and pipes, plating jet

Simplify your bright zinc plating with

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as a constant cleanser and purifier

It will:

1. Precipitate heavy metal impurities.
2. Co-precipitate copper impurities, eliminating need for zinc dust treatment.
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engine parts, etc., where abrasion and heat resistance are prime factors. Of the nickel used in civilian applications, half is accounted for by the automotive industry.

The following substitute finishes for nickel are currently being used—(1) Bright zinc and cadmium (2) Copper, chromium and a clear organic coating (3) Bright white brass.

The opinion of informed circles is that there will not be any easing in the nickel situation in the foreseeable future, in spite of the continuous increase in nickel production.

The future of nickel plating will see (1) further developments in leveling and line removal ability (2) better control of physical properties (3) better corrosion resistance from thinner coatings of nickel (4) expansion in the applications of nickel plating, such as lining the inside of vessels (5) plating of strip and wire, (6) electrotyping and (7) general engineering purposes where controlled properties are important.

E. F. Ottens, Philco Corp., discussed the "*Practical Aspects of Zinc and Cadmium Plating.*" The following bath composition was recommended: zinc cyanide — 10, sodium cyanide — 7½ and sodium hydroxide—10 oz./gal. The preferred temperature is 90°F. and it requires 5 minutes at 40 A/SF to plate 0.00015 to .0002 inches. Sulfide is maintained in the bath to precipitate lead which is introduced from the anodes. Zinc dust treatment and dummying are required to remove copper. Cleaning is done in two stages (1) spray cleaner with a diphase emulsion cleaner (2) electrocleaner. To activate dry zinc plated work for further treatments, the following was recommended — (1) vapor degrease (2) dip in weak HCl until gassing or (3) dip in a solution of cadmium oxide—¼, sodium cyanide—9 oz./gal. To remove smut brought out by pickling, the following help (1) hot cyanide solution 1-2 lbs./gal. or (2) alkaline derusting compounds.

Dr. W. L. McCracken, Detrex Corp., addressed the meeting on "*Periodic Reverse and Ultra-Sonic Cleaning.*" Periodic reverse cleaning employs a specially designed, neutral electrolyte at 8 oz./gal. and 100 A/SF. The optimum time cycle is 4 seconds anodic and 1 second cathodic. In one to three minutes a few millionths of an inch of metal is removed and with it any adhering soil or smut. The removed metal is precipitated as an insoluble phosphate. The process is presently recommended and was demonstrated for ferrous part only.

Ultrasonic cleaning employs a high frequency sound source of high intensity in a liquid medium which literally shakes the liquid against the work as well as vibrates the work itself. The demonstration included two barium titanate ceramic crystals, each vibrating at a frequency of 400 kilocycles per second and operating in a trichlorethylene bath as a cleaning medium. The first crystal brings the sound energy to a point focus and is adapted to cleaning about one square inch area. The second crystal brings the sound energy to a line focus so that larger areas may be swept in a cleaning operation. Once the minimum threshold energy is determined for a given part, the cleaning time is only a few seconds. Commercial units for plant installations are currently being built. Assisting in the demonstartions were *B. Z. Rubin* and *E. J. Hein.*

NEW! RAMPE TWIN
PRECISION BARREL FINISHER
"THE MOST MACHINE FOR THE LEAST MONEY"

This sturdily built Barrel Finisher will handle steel burnishing balls in both barrels — is amply powered by a ¾ H.P. 220 volt 3-phase motor for standard 10¾"x17" barrels or larger barrels, as desired.

WITH UNLINED BARRELS $535.00

WITH LINED BARRELS $615.00

F.O.B. Factory Cleveland, Ohio

Safety covers for barrels prevent pressure build-up. Starting button is water proof. Has ball bearing variable speed drive. 2 tote boxes are standard equipment, — also perforated covers far barrels. Lined barrels are coated with vinyl plastic.

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(pure fused silica)
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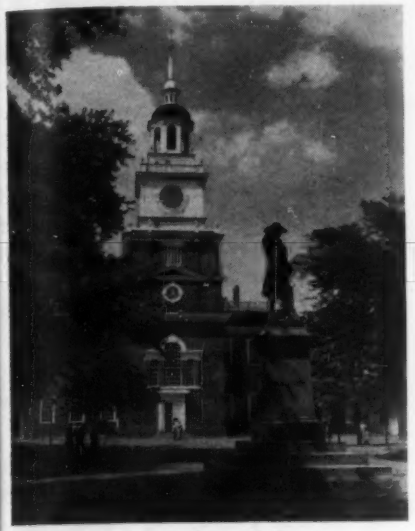
THE 40th ANNUAL A.E.S. CONVENTION TO BE HELD IN PHILADELPHIA JUNE 15-18

ALL eyes are turned toward Philadelphia where the American Electroplater's Society will hold its 40th Annual Convention in June. Great preparations are being made by the sponsors; the Philadelphia Branch and its neighbors the Allentown-Reading and the Lancaster Branches. Each year the efforts of the sponsors are stimulated by the success of the previous convention and spurred by the knowledge that upon them will be the tolerant, but critical, eyes of people like Tom Trumbour who will be attending his fortieth successive A.E.S. Convention next June.



Independence Hall.

The ancient and historic city of Philadelphia is a host in itself. Here history was made. Here is the famous Independence Hall, the Liberty Bell, and the Declaration Chamber where the Declaration of Independence was adopted by the Continental Congress. It was here that the Constitution of the United States was framed in 1787. The difficulty confronting convention visitors is time; how to cram into a few short days the wealth of experience this famous city has to offer. The Franklin Institute is a "must," especially to platers. Gathered into this Institute are more than 4,000 exhibits — all of them fascinating to those who work in fields allied to engineering, chemistry, or electricity — action exhibits of scien-

Airview of Philadelphia.

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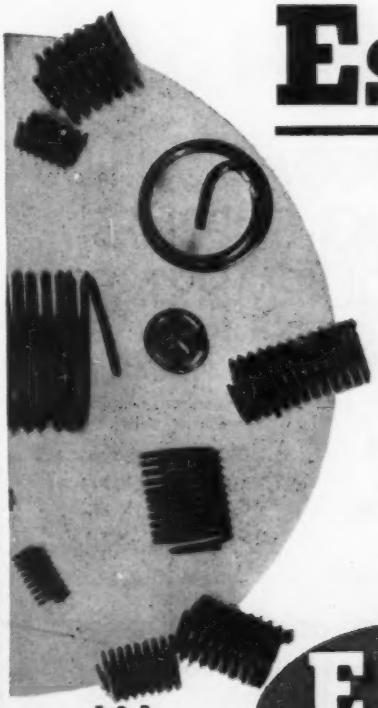

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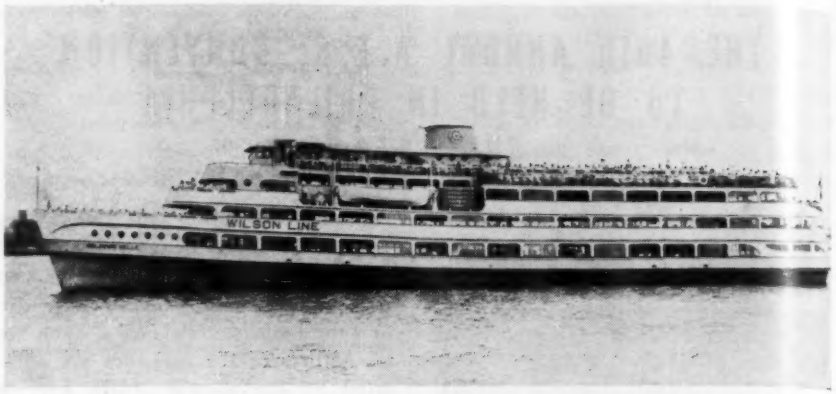
tific achievements from physics to modern transportation. The choice is almost bewildering and the point of interest will have severe competition from the excellent theaters and night clubs.

At this time of the year it is only by looking back that it is possible to capture the spirit of a convention six months away. The weather in many parts of the country is not at present conducive to thoughts of golf, picnics and the like, but the sponsors are already making plans for a convention that they hope will be a standard from which all others will be judged.

We hear of great plans for the entertainment of visitors. There will be plant visits, of course, and few cities have as much plating technology to offer as Philadelphia. The contract plating plants and shops alone number 76, and this does not include the many corporations who maintain a plating department. The industries in the area are diversified and produce a large variety of products. This means that the choice will be so wide that visitors can select the field in which they operate or take the opportunity of seeing practical demonstrations of less familiar techniques during plant visits.



The new Delaware Belle which has been chartered exclusively for the A.E.S. Excursion June 17th.

The social activities are going to be aided by the natural facilities the city has to offer. The new "Delaware Belle" has been chartered for the exclusive use of the A.E.S. for a full afternoon on the Delaware River. On Wednesday afternoon, June 17th, the trip will start down the Delawa River. Lunch will be served on board and an orchestra will provide the music for dancing. Catering will be for all tastes. Those who wish to dance will find the orchestra to their liking; those who would rather play games will find plenty of variety, and those who just want to lie back and relax in a deck chair while the sights are brought to them will have the opportunity. Even the weather has been taken into consideration. If it rains there are ample facilities for under-cover enjoyment and, should it be too hot, the lap of the water against the sides of the ship and the cool river breezes will be a refreshing interlude from convention sessions.

The pier from which the boat will sail is only a few blocks from the hotel and the trip will take in Chester, Marcus Hook and Wilmington. Among the sights will be the largest Navy Yard in

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the world, the refineries, and the new Wilmington Memorial Bridge. Need we say more? This trip is going to be interesting and enjoyable.

Even at this early date we can report to golfers that the International Fellowship Golf Tournament is going to be held on Tuesday, June 16th. The Merion Golf Course has been lined up for this event and two courses will be made available.

This is just advance information, there will be more to come. A good turn-out is expected — and wanted — so you will be kept posted regarding developments. We are expecting to receive a description of the facilities available and as soon as it comes to hand we will let you know through the medium of these columns.

Baltimore-Washington Branch

On Tuesday, November 18, 1952, the Baltimore-Washington Branch met at the National Bureau of Standards, Washington, D. C.

Thomas P. May of the *International Nickel Co.* introduced and commented on a set of sound and color films entitled "Corrosion in Action."

No Branch business was transacted.

Cincinnati Branch

The Cincinnati Branch held its annual inspection trip on November 19, 1952, when approximately fifty members and their guests visited *The Ford Motor Co.'s* new automatic transmission plant in Cincinnati. It was a most revealing sight to witness the varied and efficient methods used in the production of this most important mechanism used in today's automobile. Of particular interest, naturally, was the new plating department while all were amazed at the efficiency of the production line where the transmission is put together.

Plans are rapidly going ahead for the Branch's 1st Annual Educational Meeting and Dinner Dance to be held on March 28, 1953. An unusually high caliber of speakers is being assembled by *Ray Barry* and his committee. Further details of this function are to be announced shortly.

The Cincinnati membership was indeed saddened to learn of the very sudden passing of *Martin M. Gannon, Jr.* on November 20th. Marty had attended the plant visitation the night before his death and appeared in fine shape. He contributed greatly to the successful growth of the Branch in recent years, was a most willing worker whose pleasant personality will be sorely missed.

Charles Wise
Secretary.

Pittsburgh Branch

The *Pittsburgh Branch* of the *American Electroplaters' Society* held its annual Milwaukee Night Party on Saturday, November 8. The idea of a mid-year party arose after the Milwaukee Convention during which many local members attended the beer party. It is from this fact that the branch has been referring to the party as Milwaukee Night.

Approximately 125 people had a most enjoyable evening at the Norse Room of the Fort Pitt Hotel. They were entertained by organ music during the course of the evening and a delicious buffet supper consisting of weiners and sauerkraut, was served to everyone, along with plenty of free beer. Committee chairman. *Glenn Herring*, did an excellent job in arranging such a successful affair and the branch is looking forward to a continuation of these social events.

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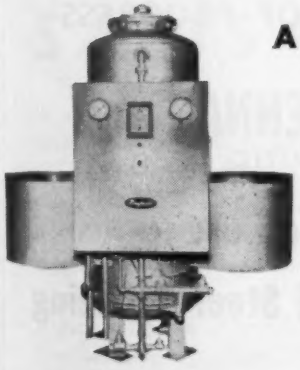

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Twin-City Branch

The Twin City Branch of the American Electroplaters Society met on Monday, December 1st, 1952 at 6:30 P.M. at the Pine Tavern in Minneapolis, Min., with 32 persons present.

Following dinner, Branch President *Jerome M. Weller* of Minneapolis-Honeywell Regulator Company introduced the following guests: *Charles C. Zuel* of Hiawatha Metalcraft Company, *George Belair* and *R. S. Carlstrom* of Merchants Chemical Co., *John R. Golden* and *Bernard J. Olson* of Brown and Bigelow. *Cliff Barth* of Merchants Chemical Co., was introduced as a member transferring to the Twin City Branch from the Cincinnati Branch and was given a welcome.

In the absence of Branch Librarian *Fred Kiam*, President Weller spoke briefly on the plant visitation program and the interest which this program has developed during this year's programing. He introduced *John R. Golden*, manager of the novelty department of Brown & Bigelow, who spoke briefly on the sales and production of Brown & Bigelow's novelty items. *Dr. Frank Ireland*, Technical Director of Brown & Bigelow and member of the Twin City Branch, spoke on the processes involved in the plating on plastics. Following the discussion on these processes the persons present drove to the Brown & Bigelow plant and viewed the electroplating and buffing operations. This program was one of the most interesting programs offered to members and guests of the Twin City Branch and was very well received.

New York Branch

The meeting was called to order by *A. Amatore* president, on Friday, November 14, 1952, at the Hotel Statler, New York.

The roll of officers was called and *Frank Briganti* was noted absent.

Mr. Amatore had the pleasure of announcing the presence of the following officers of the National Society:

F. MacStoker—president.
G. P. Swift—1st vice-president.
C. Kelley—3rd vice-president.
D. G. Foulke—executive secretary.

We also had the pleasure of the following out-of-towners at our meeting:

Mr. Glasner—Chicago, Illinois.
Mr. Glover—Boston, Massachusetts.

Applications for membership were received from the following: *H. Karron, E. Karron, J. Krobel, T. Slattery, R. Wasilewski, T. Susskind.*

The following were elected to membership, and duly installed: Messrs *Payne, Modonaca, La Rosa, Anderson, Lambert, Lovelock.*

A. Fusco, chairman of banquet committee, reported progress and also announced that the tickets will be $8.50 per person, and the date February 14, 1953, at the Hotel Statler, Grand Ball Room.

There being no other old or new business, the meeting was turned over to *P. Veit*, librarian, who presented *S. Olphie*. Mr. Olphie gave a talk on rust and the plating of stainless steel. *J. Sterling* was then presented, and he gave a talk on the old time methods of plating.

(November 28th Meeting)

The meeting was called to order by *A. Amatore*, president, on Friday, November 28, 1952, at the Hotel Statler, N. Y.

The minutes of the previous meeting were read, and approved. The roll of officers was called and *J. Sterling* and *F. Briganti* were noted absent. All other business was tabled for the next

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meeting, to be held December 12, 1952.

The meeting was then turned over to the librarian, *P. Veit*, who in turn presented *Dr. Walter Meyer* of the Enthone Corporation.

Dr. Meyer included the presentation of colored slides with his speech, showing the adhesion of electrodeposits and new methods of cleaning and oxide removal, which was most interesting.

Indianapolis Branch

On December 3rd, 1952 twenty-four members and guests met at the Fox Steak House for the regular meeting. The business meeting began at 8:00 o'clock with six additional persons attending. Guests at the meeting included *Herbert Zinsmeister*, speaker of the evening, *Charles Kelly, Claude Pritchard, Loren Stevens, Jack Cornpropst, Laurel Richeson* and *Mr. Woodruff. Mr. Reim* of the Dayton Branch was also present.

The secretary's report was read and accepted. President, *Don Patrick*, read a letter from the Supreme Society announcing an interim meeting at Neill House, Columbus, O. on January 10, 1953. This was to be a policy-making meeting and plans for business for the national convention were to be discussed. The delegates were invited to attend. A motion by *Herb Kennedy* was made to send one of the delegates to the meeting in Columbus, Ohio and pay $25.00 towards expenses. This was seconded by *Quentin Shockley* and passed.

The committee for the annual 1953 educational session and dinner dance was announced as follows:

Roman C. Bender, General chairman; *Al Kriese*, Co-chairman; *C. Robert Van Houten*, Sustaining contributions; *Frederick Anderson*, Entertainment; *Quentin Shockley*, Publicity; *Elmer Lundberg*, Tickets; *Harold Tossell*, Printing; *Carl Niehaus, Robert Ellsworth, Bill Sinclair*, Arrangements; *Edna Rohrabaugh, Jeanetta Peacock*, Favors; *Bert Hawhee*, Educational Session.

Bert Hawhee announced the speaker of the evening Mr. Herbert Zinemeister of Wallace and Tiernan who spoke on "Disposal of Plating Room Wastes." Much discussion took place at this meeting about the stream pollution code which has been enacted and to be effective January 1, 1953. It was urged that each plating shop investigate for their own good before official action comes, their shop conditions as to cyanide drainage. There will be much lobbying in the 1953 Legislature by the sportsmen of the state and the present code is on the books to show the sportsmen that something is being done. Another meeting will be in January of the stream pollution board and the Indianapolis Branch will send letters to each member of the branch stating date and urging each to attend.

The meeting adjourned at 9:25 P.M.

Chicago Branch

120 Chicago Branch members turned out on November 14 to hear *Hank Kellner* of *Lea Mfg. Co.* read a paper on bright copper plating. His informative presentation resulted in a lively question period in which *S. Lewis Doughty* assisted.

Dr. Kellner brought along a variety of plated articles to demonstrate the advantages of his copper plating cycle.

The educational session was preceded by a cocktail hour and a dinner which was also well attended.

William E. Belke, president of *Belke Mfg. Co.* explained the technical schol-

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arship plan which his company inaugurated at Northwestern University this year. The two successful applicants are *Robert Blumenthal* and *Gerald Glab*, both of Chicago.

After a six year program of study and working in electroplating plants, they will receive a bachelor of engineering degree in metal finishing.

The ladies convention committee attended the dinner meeting and met later to write their final report on the successful activities at the June convention in Chicago. The following ladies were present: *Mrs. Marian Longfield, Mrs. Ray Ledford, Mrs. Elmer Olson, Mrs. Paul Glab, Mrs. Harold Faint* and *Mrs. Edward Stanek*.

An interesting sidelight on the meeting was the presence of several father and son members. This prompted Mr. Gilbertson to comment on the good omen this presented for the future of branch membership growth. The following senior-junior combinations were noted: *Paul Glab* and son *Gerald*, *William Belke* and son *Ralph*, *George Stutz* and son *George, Jr.*

THEY WERE THERE

Ardco, Inc. turned out in full force to hear *Hank Kellner*. Their delegation included *Jim Hickey, Neal Farmer, Tom Davy, M. E. Steirnagel, Bill Hoskins* and *Bob Ruenzel*. . . . *Art Jenks* of *Stutz* got the big hellos after a long absence from Chicago branch affairs. . . . *Harry Hansen* of *Du Pont* worried about whether or not he will be included among the defendants. . . . *Roy Johnson* of *Belke* stunned a few people by his presence. . . . *Marion Vatikus* of *Western Electric* getting acquainted. . . . *Ken Edstrom* recently of *Ford*, now associated with *Mall Tool*. . . . *Gene Gryglas* real happy in his new job at *Cinch Mfg*. . . . *Vince Farr* and *Henry Dobler* promoting a soda fountain installation for the lounge. . . . *Bell & Howell's Bartman* and *Hubrich* taking over for the camera industry. . . . *Ray Ledford* now in the filter business as sales manager for *Industrial Filter and Pump Mfg. Co*. . . . *Verstagen, Zucker* and *Becvar* meeting all comers for *Hanson-Van Winkle-Munning*. . . . *Bob Stewart* and *Charlie Breckenridge* checking the thermostats in the dining room. . . . *Art Engdahl* of *Kocour* back in harness after recovering from that rich man's disease, the gout. . . . *Chet Dombrowski* of *Colonial-Premier* would like more floor lamps in the reading room.

Los Angeles Branch

G. G. Jenison, director of the chemical development and research division of Weirton Steel Co., Pittsburgh, Pa., presented a highly informative talk on "Tin Plate" at the December 10 meeting of Los Angeles Branch, American Electro-Platers' Society.

This final talk of the branch's 1952 technical series, arranged by Librarian *G. Stuart Krentel*, was of outstanding interest to the members for the reason that high-speed continuous tin plating processes have until recently been foreign to the Southern California area. An attendance of 85 members and guests at the meeting in Rodger Young Auditorium attested the interest that the announcement of the program invoked, particularly since Mr. Jenison is recognized as one of the top authorities in this country on the equipment and chemical processing required in tin plating.

Mr. Jenison first conveyed the greetings of his fellow members in Pittsburgh AES Branch and expressed the

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hope that a national AES convention will before long be re-assigned to Los Angeles.

He stated that the subject of tin plating divides itself into two categories: the hot dip method, which has been standard practice for more than half a century; and high speed tin plating of strip steel, a development of the past few years. Reviewing the early history of tinplating, he explained that the tariff established during the McKinley administration was largely responsible for the strides made in American tin plating during the past 50 years, for without that tariff, the American industry would probably still be at the mercy of the British.

World War II, which cut off some 70 per cent of the world's tin supply, was described by the speaker as the impetus which brought the electrolytic process of tinning into wide use. Today, he said, tin deposition is becoming an important part of the plating industry. "It is still a small industry," he said, "but a key industry."

Upon concluding his formal talk, Mr. Jenison presented a series of illuminated slides dealing with tin plating formulas and equipment lines. One slide, which presented the electrocleaning flow of operations in acid electrotinning as used by Weirton, appeared to be of exceptional interest to the Los Angeles members, many of whom were seen to be copying down the cycle of operations.

Branch President *Myron Orbaugh* called the business session to order at 8 p.m. Four new members were initiated: *Ken Clayton*, Wyandotte Chemical Co.; *Robert Becker*, Modern Plating Co.; *J. Born, Jr.*, Virtue Bros. Co.; and *John C. Murietta*, Kaynor Mfg. Co.

Guests introduced by Sergeant-at-arms *George Hetz* were: *James Marovich*, *George Kalbfleisch* and *Harold Corner* of United Can & Glass Co.; *Harry Redding*, Kaiser Steel Co.; *J. E. Allen*, Weirton Steel Co.; *George Maqurean*, U. S. Spring & Bumper Co.; *R. A. McDonald*, Harvey Machine Co. who is a member of Detroit, Mich., AES Branch; *Frank Little*, Udylite Corp.; *Fred Ajluine*, Atlas Plating Co.; and *George Spotts*, assistant manager of the plating and electro-chemical division, Federated Metals, a member of Philadelphia, Pa., Branch.

Reports by *George Hetz* and *Stuart Krentel* of the committee arranging the 1953 annual educational session on March 21, indicated that inquiries sent out for eastern and west coast speakers warranted the belief that a diversified program of technical talks, excelling even the fine speakers' list presented in 1952, was in the making for the 1953 session at the Los Angeles Statler Hotel.

NATIONAL ASSOCIATION OF CORROSION ENGINEERS

South Central Region to Meet in Tulsa Oct. 7-9, 1953

South Central Region, National Association of Corrosion Engineers, comprising the states of Colorado, Kansas, Oklahoma, Arkansas, Louisiana, Texas and New Mexico, has scheduled its 1953 meeting in Tulsa, Oklahoma. Tentative dates are October 7-9 and the Mayo Hotel has been designated headquarters.

The region's 1952 meeting, held in New Orleans October 1-3, attracted more than 500 persons.

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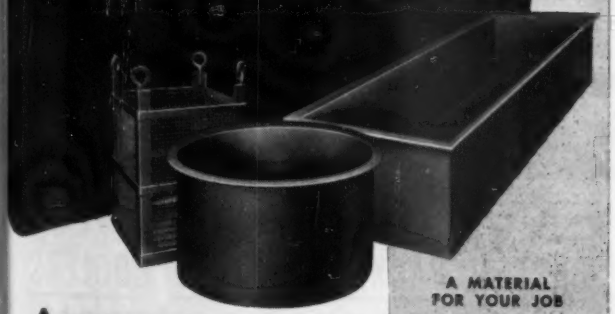

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NEW BOOKS

Encyclopedia of Surface-Active Agents

J. P. Sisley & P. J. Wood. Published by Chemical Publishing Co., Inc., 212 Fifth Ave., New York 10, N. Y. Price: $15.00. 540 pages.

The plater-chemist who is interested in applying surfactants to his processing solutions will find this book to answer practically all of his requirements as to type, composition, applications and sources of available materials. The volume is in two parts, the first dealing with the characteristics of the different classes of wetting agents, including current manufacturing methods. The second, which would be of much greater interest to metal finishers, is the alphabetical listing of the brand names and their manufacturers. This section not only classifies the different materials but lists their physical and chemical properties, patents, references and applications. In view of the broad field in which such materials find application to the plater's problems, including cleaning, pickling, rinsing, plating and other surface treatments, the book may be considered a desirable addition to the metal finishing library.

Corrosion Testing Procedures

F. A. Champion. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. Price $6.50. 355 pages.

As the title indicates, this book most completely describes and compares the various methods employed to determine the effects of corrosive environments on metals. The treatment is thorough, although the author makes no attempt to discuss evaluation of results obtained from such tests. The selection of test procedures and preparation of samples for both laboratory and field tests are covered in great detail and a chapter is devoted to the expression and determination of results. The author and subject indices are very convenient for reference to particular procedures and the articles quoted are so voluminous as to constitute a complete bibliography of the literature, the references listed at the end of the chapter on laboratory exposure conditions, for example, amounting to 173 in number.

Disposal of Spent Sulfate Pickling Solutions

Ohio Valley Water Sanitation Commission 414 Walnut St., Cincinnati 2, O. 76 pages. $2.00.

This is another manual in the series being published by the commission to provide authoritative information on treatment methods for industrial wastes. It was prepared under the auspices of the commission's Steel Industry Action Committee by *Dr. Richard Hoak*, fellow of the American Iron and Steel Institute, and a subcommittee headed by *Dr. Thomas F. Reed* of U. S. Steel Corp. The illustrated manual describes neutralization procedures in detail, discusses methods for recovery of various by-products and includes appendices on analytical methods and determination of basicity factors. Copies of the manual, priced at $2.00, may be obtained by addressing the commission at 414 Walnut Street, Cincinnati 2, O.

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News from California

By Fred A. Hess

Cadmium & Nickel Plating Co., Los Angeles, has placed into operation a new department for production plating on electrical components, special technical and research activity, and the variety of industrial applications calling for a precious metal finish.

The new department, 40 x 60 feet area is completely closed off from the remainder of the firm's plant at 1400 Long Beach Boulevard to insure maximum security.

E. T. Brown, general manager, reports that facilities for plating the following finishes have been installed: gold and silver alloys, silver, Albaloy, palladium, rhodium, indium, platinum and nickel.

Barrel and still plating tank facilities consist of 1,750 gallons of bright high-speed silver plating solution and 90 gallons of 24k. gold plating solution. The size of the new operations calls for 6,350 amperes. Owners of Cad-Nickel are *M. W. Hays* and *Oliver Pentley*.

Cal-Coast Lead Construction Co. is one of the newer firms which is establishing itself on a firm basis in the Southern California industrial scene on a policy of good service and quality work. The company was organized in July, 1952, by co-partners *Clinton A. Sullivan* and *R. C. Betty* to supply lead installations for the electro-plating and other industries. It designs tanks with all types of lead linings and also manufactures lead coils and anodes to specifications. The company's initial plant at 3974 North Mission Blvd., Los Angeles, already shows signs of bursting at the seams, and plans for expansion are under consideration for 1953.

The Drayer-Hanson Co., Los Angeles, is nearing completion on the installation of an Iridite system for processing aluminum jettison fuel tanks for Army planes. The system to clean and etch the drop-off tanks was decided upon because it provides a good paint base and will minimize the interior corrosion that the Army had experienced with such tanks due to the effect of high octane gasoline.

The *William A. Vensel Co.* of Los Angeles installed an 82-foot-long system, complete with conveyor equipment and paint booth. All the process tanks, except the Iridite spray, which is of stainless steel, are of conventional steel construction.

The U. S. Naval Construction Battalion Center at Point Hueneme, Calif., has now in successful operation a pickling unit for derusting metal gear and equipment that will eventually wind up at overseas Naval bases.

Rust removal as well as operations involving the application of preservatives are conducted at the Point Hueneme Center, some 60 miles northwest of Los Angeles. The present pickling setup was installed when it was found that the large volume of material to be derusted made normal manual cleaning and derusting techniques too costly as well as inefficient.

The pickling installation now in use,

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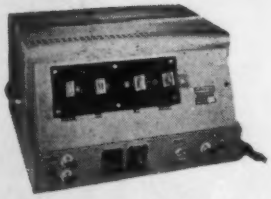

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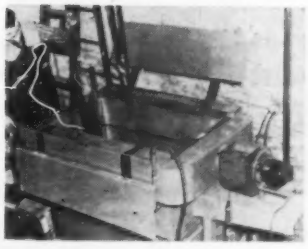

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Gas heated (thermostatically controlled) vapor spray unit for cleaning electronic equipment. Note the compact exhaust system and heavy duty split cover.

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and which reportedly is doing an extremely competent job, consists of eight tanks, using sulphuric acid with the required neutralizer and passivator agents. Seven tanks are fitted with roll-up pontoon cells. One tank, lined with rubber membrane and acid resisting brick, is installed in a pit as a precaution against leakage. A submerged combustion burner, constructed of acid resistant material, is used to heat the acid solution.

The set-up has a capacity of 25 tons per eight hour shift. Average time cycle is about 1 hour and 20 minutes, including pre-soak, degrease, paint strip, pickle, water rinse, neutralize, passivate and apply rust preventative.

A feature of the pickling installation is said to be its comparatively low cost—$35,000. The pickling setup was designed and installed by personnel of the Navy Advanced Base Supply Depot and Public Works Dept.

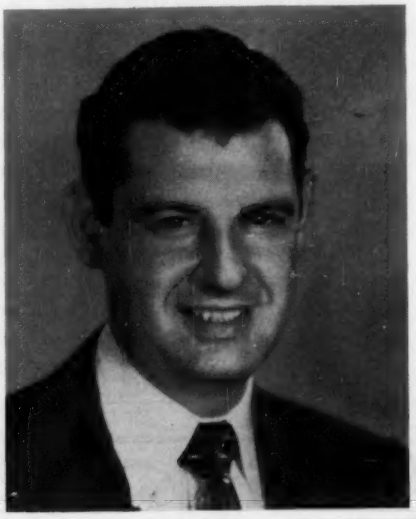
Ownership of the *Western Galvanizing Co.*, 2701 South Soto St., Los Angeles, has been acquired by *Elliot S. Evans.*

The eighth Western Metal Congress will be held at the Statler Hotel, Los Angeles, March 23 to 27. Simultaneously the Western Metal Exposition, featuring displays of recent metal engineering developments, will be in progress in Los Angeles Pan-Pacific Auditorium.

The exposition and technical conference will again be sponsored by the *American Society for Metals* in collaboration with the *American Electro-Platers' Society, American Society for Testing Materials, Society for Non-Destructive Testing*, and eight other technical groups.

William H. Eisenman, national secretary of the ASM, who has established his headquarters in Los Angeles to supervise show preparations, reports that the 1953 exhibit of metal production, fabrication and application will be given on a scale larger than any of the previous seven presentations in the West. Metals and their fabrication for armament, industry, aircraft, motors, mining, marine, petroleum and chemical applications will be shown. Noted speakers from production centers throughout the country are scheduled to appear at the Congress' technical sessions to describe new developments in titanium, zirconium and other metals for war and industry.

L. H. Butcher to Erect New Building



Jack Raskin

Jack Raskin, newly appointed general manager for the entire west coast metal finishing division of the *L. H. Butcher Co.*, a subsidiary of the *Udylite Corp.*, has announced that the Butcher Company, in keeping with its expansion policy, has completed plans for erection of a new building in Los Angeles to house its manufacturing facilities as well as to provide larger space for its laboratory and plating pilot plant.

The new building will also house the manufacturing unit for the company's buffing and polishing compounds and will offer expanded facilities for production of *Enthone*, *Allied Research* and *Udylite* products. *Earl W. Arnold* has been appointed assistant to Raskin.

Beckman Appoints Fletcher Special Products Manager

Beckman Instruments, Inc. announced the appointment today of *Taylor Fletcher* as manager, special products division. Fletcher replaces the former manager, *John F. Eishop*, who was recently made assistant general manager of this company.

As design engineer, Fletcher con-

Taylor Fletcher

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tributed to the development of the Beckman Aquameter, Electronic Analog Simulating Equipment and the Phase Equilibrium Computer. In his new position Fletcher will "continue to emphasize expansion toward new products, production prototypes and exploratory research in all phases of automatic control instruments."

Fletcher received his Bachelor of Science degree in electrical engineering at California Institute of Technology, Pasadena, 1948. He completed graduate work in advanced meteorology, New York University and laid the foundation for his present creative engineering work when assigned as design engineer for *General Electric*, Schenectady, N. Y. and electronic technician with Jet Propulsion Labs, Pasadena, Calif.

Born in Altadena, Calif., Fletcher, 31, resides in Arcadia with his wife and two children. He is a member of Cal-Tech Alumni Association, the American Institute of Electrical Engineers and Tau Beta Pi.

Oakite Service Representatives Hold Annual Technical-Sales Conference

Field service representatives from the North Pacific Coast, South Pacific Coast, Southwestern and Milwaukee sales divisions of *Oakite Products, Inc.*, manufacturers of specialized cleaning and allied materials, are shown as they gathered for a series of technical-sales meetings at the Hollywood-Roosevelt Hotel, Hollywood, November 10-12. Featured at these meetings were reports from Oakite research chemists, service engineers and technicians on recent developments in cleaning and related procedures designed to assist industry in combating rising operating costs. Similar meetings were held in St. Louis and New York City for representatives from other divisions of the company's technical field service organization.

C. A. "Cap" Peterson, technical service representative in the Los Angeles area is shown above as he received a special scroll in connection with the company's Distinguished Service Award program from John A. Carter, Oakite president. The program calls for awards to be made annually to the five members of the firm's nation-wide field organization adjudged to have rendered especially notable service to industry during the year.

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1—Bennett-O'Connell 2000 amp. 6 volt motor generator set with 20 HP 840 RPM motor.
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1—COLUMBIA ELECTRIC 1500/750 ampere, 6/12 volt, interpole design, 1200 RPM, exciter in head. Ser. #4545247.

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